

# THE IRON AGE

Established 1855

New York, November 19, 1914

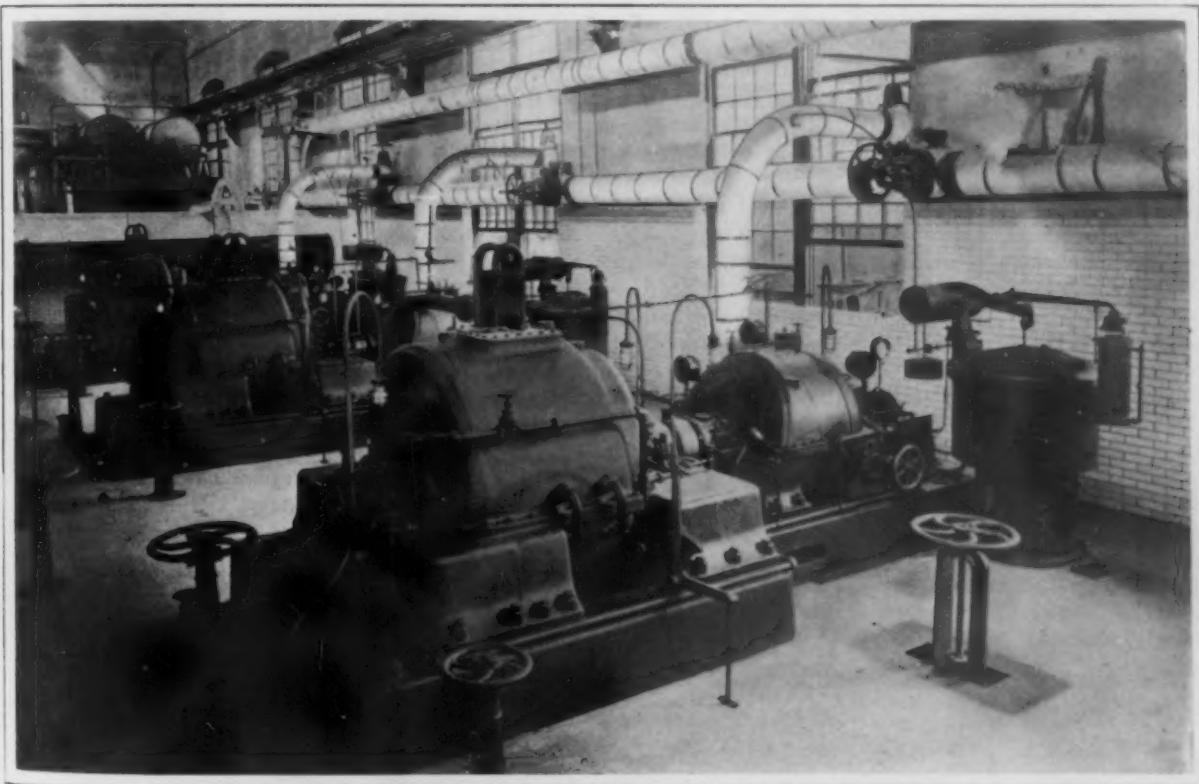
Vol. 94 : No. 21

## By-Product Coke Ovens at Sparrows Point

Koppers Plant at the Works of the  
Maryland Steel Company—Gas Sup-  
plied to Baltimore for Illumination

For the past twelve years the Maryland Steel Company has been operating by-product coke ovens at Sparrows Point, Md., on a large scale. It has produced coke suitable for use in its blast furnaces and supplied the surplus coke-oven gas as an illuminating gas for consumption in Baltimore, connected to the plant by a pipe line 12 miles long. This year a new coke oven plant was put in operation, dis-

operation, but through wear and tear the usefulness of the plant gradually diminished until it was decided that it was no longer an economic proposition to attempt to maintain it. Before definitely deciding on the type of oven for the new equipment, the Maryland Steel Company contracted with the H. Koppers Company for an experimental plant consisting of six ovens of 15 tons capacity each.

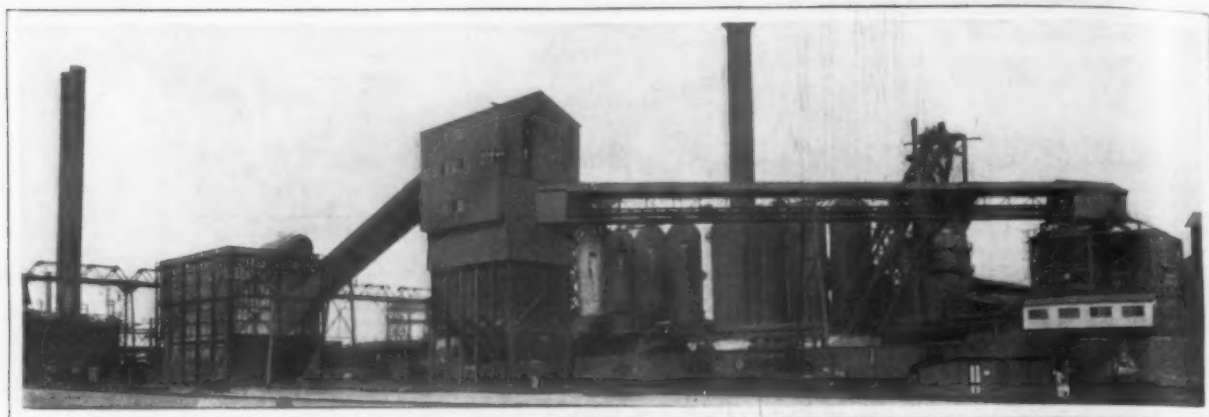


The Three Southwark Exhausters, Showing at the Right One of the Suction Regulators; On the Platform in the Rear Are the Benzol Stills

placing the initial installation made in 1903. The latter comprised 200 United Otto ovens, arranged in four batteries of 50 each, each oven having a capacity of 9 net tons of coal. The new plant comprises 120 Koppers ovens arranged in two batteries, each oven of  $13\frac{1}{4}$  net tons coal capacity. Both of the new batteries carbonize on 18-hr. coking time, so that there is a daily capacity of 2100 tons of coal, yielding about 1500 tons of blast furnace coke.

The pioneer installation had a long successful

A factor in the decision was the use of silica bricks in the Koppers oven, with the promise of longer life than from clay brick oven construction. Construction of the experimental plant was begun about November, 1912, but before this battery was started the Maryland Steel Company closed in May, 1913, with the Koppers Company for the present plant of 120 ovens. As in the original plant, the gas from the ovens is divided into a rich and a lean portion, the former before being sent to Baltimore being enriched with benzol obtained from the



Quenching Station at Left, Coke Screening House in the Center and Coke Storage Bins at the Right, with Conveyor from Screening House to Storage Bins

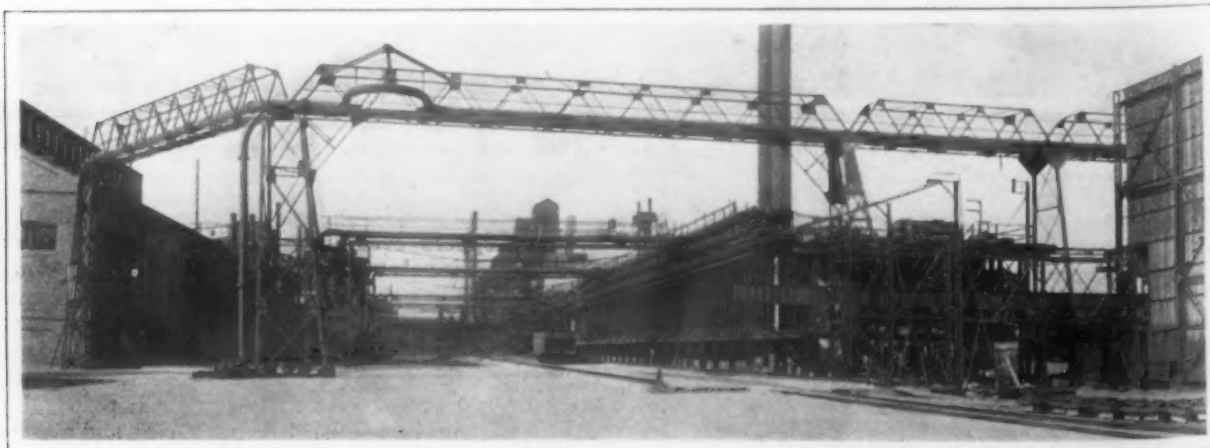
leaner gas, as stated. The plant also provides for the recovery of tar and the Koppers process of manufacture of ammonium sulphate, and in the usual way the lean gas is used as a source of heat in the ovens themselves.

The general arrangement of the new plant is shown in the accompanying plan. Ground was broken in May, 1913, and construction was completed in July, 1914, when one battery of 60 ovens was put into operation. The ovens are located near the shore line in close proximity to the three blast furnaces. The new work designed and installed by the Koppers Company starts with a belt conveyor for the crushed coal and includes a new coal bin, the ovens and apparatus and appliances belonging to the oven plant, and a belt coke conveyor discharging the coke into the blast furnace coke bin. The complete plant, including the original coal storage yard and coal handling and coal crushing equipment, the by-product recovery plant, coke screening station and tracks tributary to the oven plant, occupies an area of about 11.5 acres. The new batteries are built in a single line, with an axis at right angles to that occupied by the former ovens. The plant is designed so that two additional batteries of 60 ovens each can be installed to the eastward in line with the present batteries. The by-product plant parallels the batteries to the south, and is laid out so that additional by-product apparatus for future batteries may be installed in an extension of the first building without interfering with the operation of the existing plant. The coke quenching station is located at the east end and will thus eventually lie opposite the free space of about 120 ft. which will be provided between batteries Nos. 2 and 3. One of the features of the plant is that the coke is delivered from the screen-

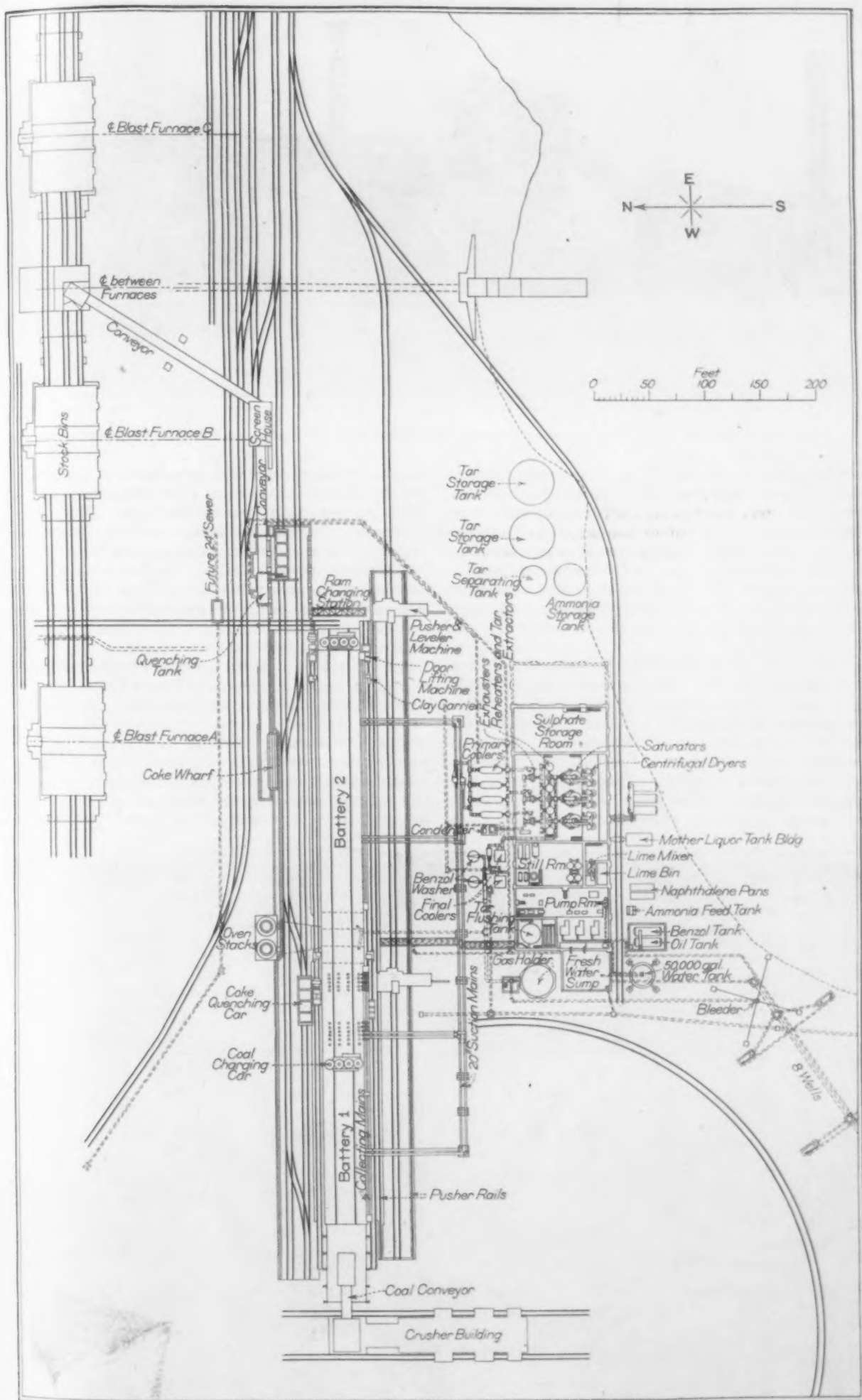
ing station to the coke bin at the blast furnace trestle directly by means of a belt conveyor.

Coal arriving at the plant by rail may be used immediately or stored and subsequently reclaimed by a revolving coal bridge of 280 ft. span, pivoted at one end and located at the extreme west end of the plant. A mixture of coal containing 28 to 29 per cent. volatile matter is used. The coal is crushed in the coal crushing plant installed for the original ovens. When it leaves the building it is of such fineness that about 75 per cent. will pass through a  $\frac{1}{8}$ -in. mesh sieve. Coals mixed in the desired proportion are elevated by the original bucket conveyors, located in a 100-ft. coal tower and delivering to a belt conveyor which carries the coal into the coal bin at the west end of and serving the two new batteries. The conveyor from the coal tower to the bin is a 36-in. belt and is about 65 ft. long.

The coal bin is of 2200 tons capacity and of square design built of steel plate heavily reinforced and supported by a structural steel construction with roof and sides of corrugated galvanized steel. It has four rows of four hoppers, each closed by gates, which discharge the coal into the four conical hoppers of the coal larry car. Below the coal bin and flush with the top of the ovens there is a scale platform with a 50-ton scale of the indicating type for weighing the coal charged into the ovens. The larry car which travels on top of the ovens on rails spaced about 17 ft. 8 in. apart has a capacity corresponding to one oven charge. It is operated by a direct-current motor completely enclosed for protection against coal dust. Each hopper of the larry is closed by a gate which can be operated by a system of levers from the cab. After receiving the coal charge at the bin the coal larry is run over the

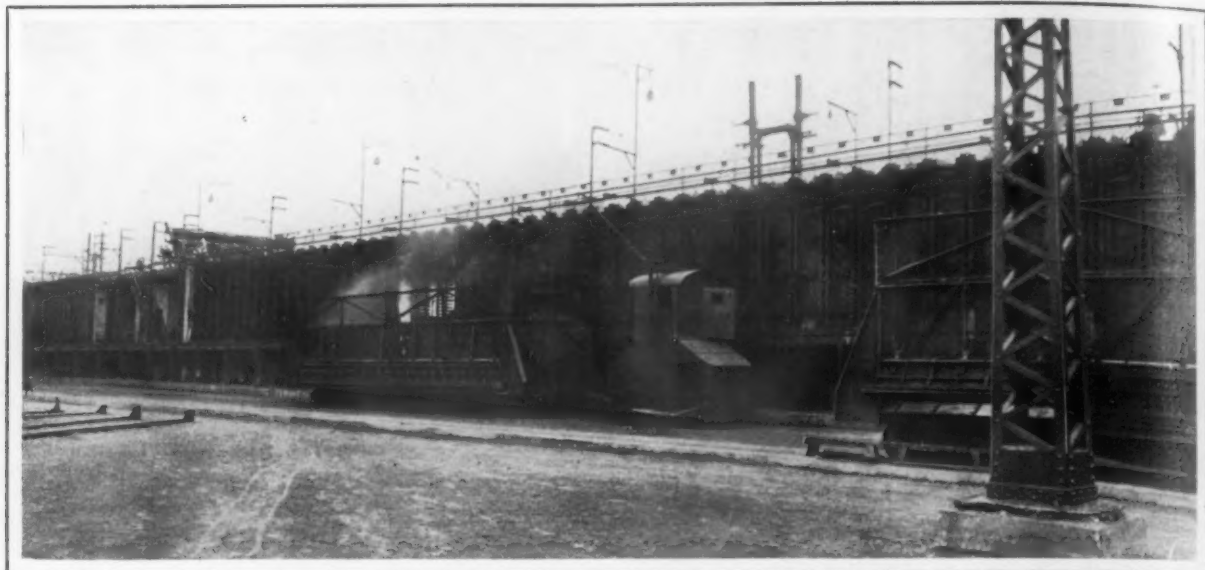


Pusher Side of the Ovens Showing the Gas Mains Running Over to the Coolers of the By-Product Recovery Plant at the Left



General Map of the By-Product Coke Ovens at Works of the Maryland Steel Company at Sparrows Point, Md.





The Quenching Car with the Electric Hauling Locomotive, Showing in the Distance the Larry Oven-Charging Car

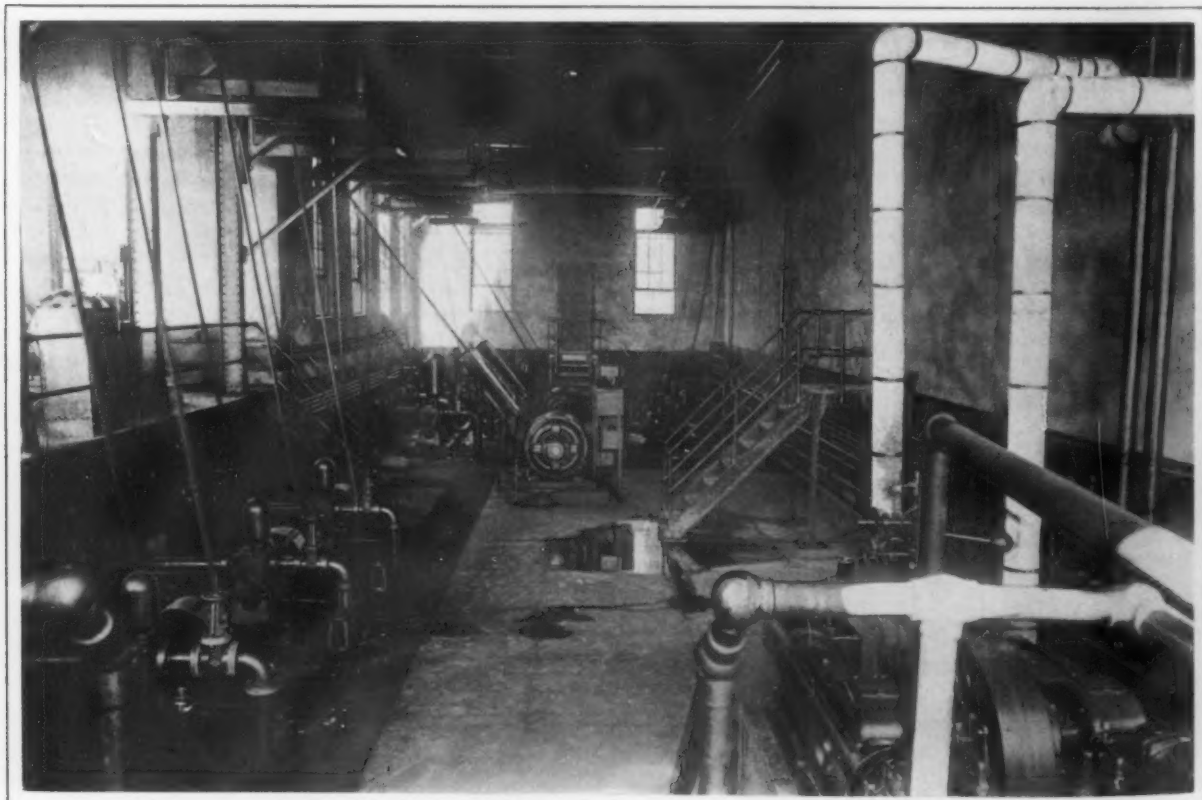
oven which is to be charged, and the spouts register with the four charging holes in the top of each oven. The larry car has also attached a swab crane which can be swung out of the way when the car travels. This swab is hand operated by means of a winch and its position on the larry car is such that the swab is directly above the stand pipe when the larry car is in position for charging. A complete spare larry car is provided.

#### THE OVENS

Each battery of ovens comprises a space of about 235 ft. in length and 40 ft. in width, exclusive of pusher foundations. The oven chambers are 18½ in. wide at the pusher end and 21 in. at the coke end. They are about 10 ft. high and 37 ft. long between doors. The gas offtakes are arranged on the pusher side. The regenerators are located below the oven chambers, each oven

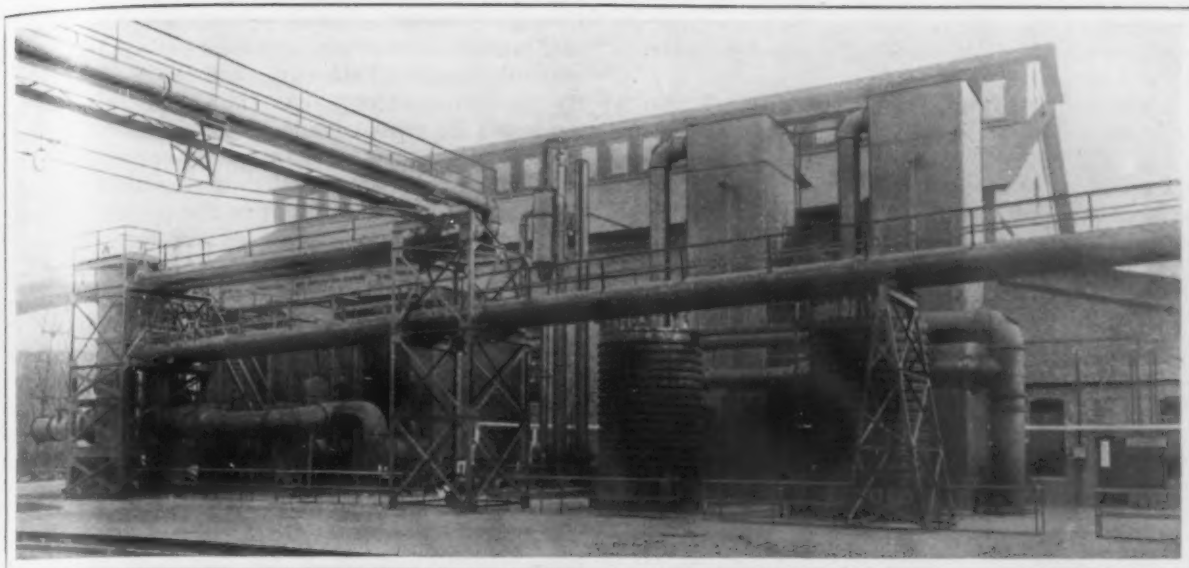
having its individual regenerator, so that any number of individual ovens can be shut down without affecting the regulation of the ovens remaining in operation. At the end of each battery the reversing machine is installed which at intervals of ½ hr. by means of wire cables automatically operates the gas cocks and air valves as well as the reversing dampers. The open doors are of the clay luted Koppers type and are handled by electrically operated door-extracting machines on the pusher as well as on the coke side. Spare doors are conveniently suspended in racks at the ends of each battery and are easily handled by the door machines.

The combined coke pusher and leveler machine, of which there are two, one in operation and one serving as a spare, runs on a 30-ft. gauge track and is equipped with individual motors for operating the pusher ram and the leveler bar and with a bridge motor for propelling the pusher on the track.



The Pump Room of the Recovery Plant





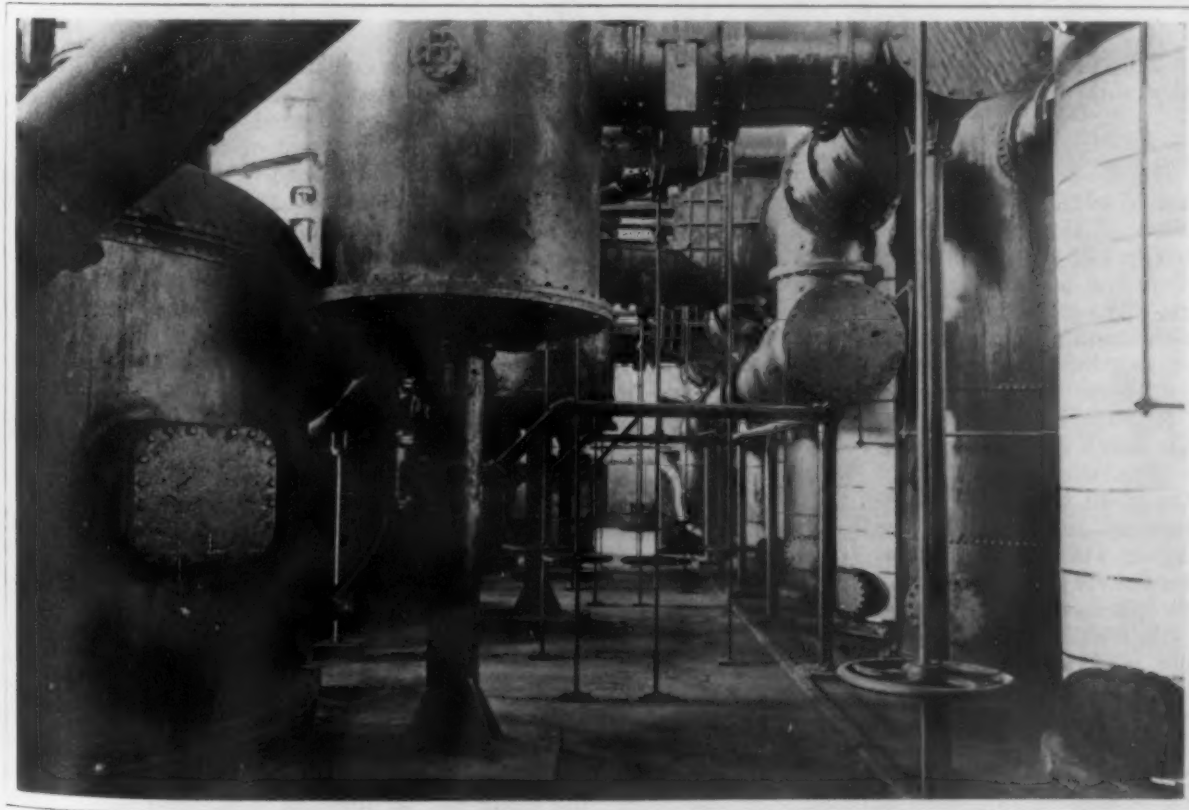
The Primary Coolers, Benzol Washers and Final Coolers, Looking Toward the Recovery Plant

The motors are provided with solenoid brakes, indicators showing the positions of both rams and the necessary controlling apparatus, all located in the cab. There is also a recording ammeter for the ram motor. The machine is provided with a hand operated crank for withdrawing the pusher ram and the leveler bar in case of emergency. The pusher bar is operated by rack and pinion and is supported by rollers and equipped at one end with a pusher head. The leveler ram for leveling the coal charge after charging is operated by wire cable. At the extreme east end of the two batteries, the ram changing station is installed, where a spare ram for the pusher machine is kept.

On the coke side of the battery there is a substantial coke guide running on the same track as the door extracting machine and propelled by the latter. The coke is pushed into a coke quenching

car with four side gates operated by air cylinders. The bottom of the quenching car is inclined to one side and the capacity of the car is about one oven charge. The car is mounted on two 4-wheel standard trucks running on standard gauge tracks. The coke quenching car is propelled by an electric locomotive shown in one of the illustrations.

The car is run to the coke-quenching station which is located at the east and north of the two batteries. Water received from condensers and of course hot is used for quenching and a tank holding about 20,000 gal. of water is provided supported on a tower. A centrifugal pump supplies the hot water. Two pipes with flat nozzles are arranged above the centers of the two quenching tracks. Hand-operated quick-opening valves allow a sheet of water to descend on the hot coke while the car is passed back and forth several times for a thorough



Saturators at the Left and Reheaters and Tar Extractors at the Right

quenching of the coke. The coke is then taken to the coke cooling wharf where it is allowed to steam off for a short time.

From the coke wharf the coke slides upon a 36-in. belt conveyor by means of feeder rolls which uniformly distribute the coke on the belt conveyor. This arrangement serves to protect the coke against breakage, so that a very small amount of breeze results. The moisture in the coke delivered on the belt is about 4 per cent. The 36-in. belt conveyor carries the coke to the coke screening station. This is equipped for separating blast-furnace coke, domestic coke and breeze. The run of oven coke is delivered on a grizzly and the blast-furnace coke which stays on the grizzly is delivered to another 36-in. conveyor about 200 ft. long which delivers it into the coke bin located between blast furnaces B and C. The coke passing the grizzly falls on balanced shaking screens and is separated into domestic coke and coke breeze, which are deposited in storage bins whence they are loaded into railroad cars.

Each battery has a stack of brick lining about 8 ft. in inside diameter and 200 ft. high built of steel plate.

As already mentioned, each oven has a gas ascension pipe on the pusher side. The gas is separated into a rich and a lean portion. For this purpose two collecting mains are installed. At the ends of these mains pitch traps are arranged and they are also provided with cleaning holes along the top for spooning the pitch. Four suction pipes are connected to the collecting mains of which two carry the rich gas and two the lean gas. The division of the gas into its rich and lean portion is made by means of butterfly valves, in such a way that the gas of the first part of the coking period is allowed to enter the rich gas main, while the gas evolved the latter part of the coking period enters the lean gas main by maneuvering the butterfly valves at a certain time. The suction pipes leading from the collecting main connect into two suction mains, one for rich gas and one for lean gas. These in turn are connected to the primary coolers. The gas pressure is automatically regulated by governors which maintain a slight pressure in the collecting mains within narrow limits.

#### BY-PRODUCT PLANT

The by-product plant is situated south of the ovens. The rich and the lean gas enters the primary coolers. The tar and weak ammonia liquor precipitated in the primary coolers is drained off at the bottom and piped to the hot drain and tar flushing tank. The gas then enters the by-product building which contains three rows of apparatus, one for rich gas, one for lean gas and one which is held as a spare. The present by-product building is 86 ft. wide by 160 ft. long and is subdivided by walls into a sulphate storage room of 40 ft. length, the apparatus room of 80 ft. length and one still room of 40 ft. length. When the two future batteries are installed the length of the by-product building will be increased 40 ft., moving the present sulphate storage room farther east and giving sufficient space to add two more rows of apparatus in the middle of the by-product house. The still room is arranged so that an additional ammonia still and the necessary benzol apparatus can be installed.

The pump room is arranged in a lean-to of the by-product building proper. This is also planned to accommodate additional equipment for two more batteries. There are three turbo-exhausters to handle all the gas produced in the plant, operated

by high-pressure condensing steam turbines. The sets were built by the Southwark Foundry & Machine Company. Each turbo exhauster has a capacity to deliver 15,000 cu. ft. of gas per minute against 4 lb. pressure and is provided with a regulator to maintain a constant suction pressure on the suction mains. The exhausters draw the gas from a gas main located in front of the primary coolers.

A system of gate valves permits any of the primary coolers to be shut off for cleaning and to be connected for rich or lean gas. The exhausters discharge the gas into a main which in turn is connected to four tar extractors, two of which are spares. Gate valves at the inlet and outlet of each tar extractor allow each tar extractor to be cut off the line for cleaning. The tar extractors are of the Koppers P. & A. type and equipped with five bells each.

From the tar extractors the gas enters the reheaters, two of which are in operation, where the temperature is raised by exhaust steam. From the reheaters the gas enters the lead-lined saturators. Here it passes through a saturated solution of ammonium sulphate containing about 5 per cent. of free sulphuric acid. The ammonia combines with the sulphuric acid producing ammonium sulphate, which is precipitated and collects in the conical bottom of the saturator to be discharged into the drainage table by means of an ejector. Two centrifugal dryers are installed for each draining table. The dry salt is discharged into buggies and wheeled to the sulphate storage room. The gas leaving the saturators passes lead-lined acid separators and then enters two gas mains, one for rich gas and one for lean gas, leading to the final coolers. The final coolers are located at the outside of the building near the primary coolers and are of the direct water contact type. The lean gas then passes benzol washers and is conducted by an underground main to a gas holder of 17,500 cu. ft. capacity. From this pipe line branch off a bleeder pipe, a pipe line to the steel mill and a pipe returning the lean gas to the coke ovens. The rich gas, to which the benzol recovered from the lean gas has been added for enrichment, is piped to Baltimore, as stated.

The still room contains the lime bin, lime mixer, lime pump and two ammonia stills to distill the small amount of condensed ammonia water from the primary cooler. Most of this ammonia is in a combined form and has to be treated with lime in the stills. The vapors are returned into the gas main and subsequently enter the saturators. At the north end of the still room there are installed two crude benzol stills, the wash oil still, heat exchanger, light oil cooler, separator, superheaters and the enrichment apparatus.

The pump house contains three motor-driven air compressors for lifting the water from eight fresh-water wells, which provide the necessary fresh water for the plant. The water is piped to a fresh water sump and pumped by centrifugal motor-driven pumps into a 50,000-gal. tower. A steam-driven air compressor is located in the southeast corner of the pump house. Tar loading, ammonia liquor, hot drain and tar flushing pumps, as well as the wash oil pumps are located in the pump room and are driven by shafting and belts from electric motors. The hot drain and tar flushing tank which receives all drains from the plant is located outside of the pump room. The tar flushing pumps are connected to this tank for continuous circulation of tar through the gas collecting mains. Behind the hot drain and tar flushing tank, the wash oil circulating tank and the three wash oil coolers for the benzol plant are located. South of the by-product

building there are two benzol storage tanks, naphthalene pans and three acid storage tanks, and further to the east the ammonia storage tank, the tar separating tank and two tar storage tanks.

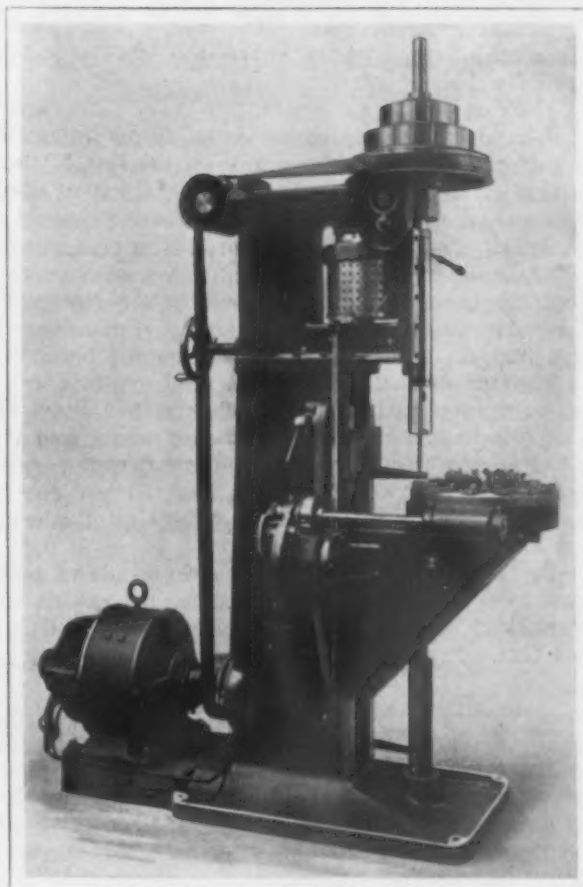
About 5800 cu. ft. of rich gas per ton of coal carbonized, having an average heating value of about 620 B.t.u., is delivered to Baltimore, and about 4450 cu. ft. of lean gas of about 490 B.t.u. is used for coking, so that of the total quantity of 10,250 cu. ft. of gas per ton of coal, only a little over 43 per cent. is used for coal carbonization, while nearly 57 per cent. is surplus gas. Reduced to the B.t.u. basis, the requirements for coking are only 38 per cent., while 62 per cent. of the total heat value of the gas is available for outside purposes. At the present time with only one battery in operation the total surplus gas is furnished to Baltimore. Provision is made, however, for future use of portion of the surplus gas in the steel plant. To this end a gas by-pass is installed between the rich gas and lean gas mains after the final coolers. This by-pass is equipped with a gas seal to permit travel of the gas only in one direction, so that rich gas may flow into the lean gas mains while it is impossible for lean gas to find its way back into the rich gas main. This feature serves to provide for an automatic adjustment of the quantity of rich gas furnished to Baltimore according to the demand. Since the by-pass is located between the final coolers and benzol washers, the benzol is extracted also from such portions of the rich gas which, owing to reduced demand on the part of the city, enter the lean gas system through the gas seal.

### Drilling Machine for Rapid Work

After considerable study and experimenting an automatic drilling machine for rapid work has been developed by Baker Brothers, Toledo, Ohio. As the name indicates, it is automatic in operation and performs the movements of bringing the work under the drill, advancing the tool to the work, engaging the feed, withdrawing the tool and removing the work without any attention on the part of the operator beyond one depression of a foot treadle for each piece. A constant production of eight 1-in. holes per min., including chucking, is maintained by the machine which is driven by a  $7\frac{1}{2}$ -hp. adjustable-speed Westinghouse electric motor. Two types of table are furnished, one of the plain variety and one having automatic indexing.

On the plain table machine the operator places the work under the drilling spindle and trips the machine with a foot lever, the same as in the operation of a punch press. The spindle is quickly advanced to the work, the hole is drilled, the tool withdrawn and the feed disengaged. The finished piece of work is removed from the table and another substituted, after which the foot lever is again depressed and cycle of operations is repeated. In this way, it is pointed out, the operator can use both hands in placing the work and obtain rapid production. The feed is secured by cams which are relied upon to give a very powerful feed with a quick return feature. A feed with a dowel end is also obtained which enables the machine to be used for facing work to an exact depth as well as a feed on which the correct lead for threading can be secured.

With the revolving table, an automatic indexing motion is provided which, at the instant the spindle is withdrawn, advances the table to the next position and brings a new piece of stock under the



A Motor-Driven Automatic Machine for the Rapid Drilling of Small Holes

tool. From six to eight chucks are usually provided on the table when this machine is employed for chucking work. With this equipment, all that it is necessary for the operator to do is to chuck and remove the work and it is pointed out that the operation of the machine does not require any attention other than the keeping of the tools sharp. The period occupied by the withdrawal of the working tool and the indexing of the table is from 1 to 3 sec. If a drill should break, the machine can be stopped instantly and if it should be found desirable, it is possible to skip any number of chucks by so arranging the indexing mechanism instead of having it advance the table to the next position.

### Industrial Education Meeting

The advance programme of the convention of the National Society for the Promotion of Industrial Education, to be held in Richmond, Va., December 9-12, has been issued. The leading feature of the meeting will be the presentation of the findings of those who have been studying the industries of Richmond, with the idea of developing proper methods for providing for the industrial education of the community. It appears that the survey has included analyses of 108 occupations in metal, printing, building and tobacco industries. This subject will be taken up on Thursday, December 10, in a morning session beginning at 9:30 a. m., and an afternoon session at 2 p. m. The findings of the school survey are to be presented by Dr. Leonard P. Ayres, of the Russell Sage Foundation, New York City, and those of the industrial survey by Charles H. Winslow, expert of the bureau of labor statistics, Washington.

The Fenn Mfg. Company, Charlotte, Mich., manufacturer of post hole augers and scythe snaths, reports that its outlook for business for the coming winter is exceptionally good. Enough orders are now on the books to provide for the continuous operation of its new plant through the winter.



BORON IN STEEL AND IRON

Interesting Results of German Experiments Show No Practical Benefits

A report on the influence of boron on soft steel and cast iron, issued from the metallurgical laboratory of the Bitterfeld Electrochemical Works, Germany, is printed in Stahl und Eisen, September 24, 1914. The literature of boron-iron compounds is very meager, and only in connection with boron-steels has there been anything definite accomplished. For purposes of the tests a quantity of ferroboron was made in the electric furnace out of boracite. As high grade material of this kind exhibits difficulties in application, boron being rather sparsely soluble in iron, a low percentage alloy was aimed at, and the analysis gave the following rough percentages: Boron, 15 per cent.; iron, 81 per cent.; carbon, 0.7 per cent, and small quantities of silicon and aluminum.

*Tests with Mild Steel.*—The best grade of soft steel was used and the alloy added in calculated quantities; melting was done in crucibles, and ingots cast.

	Percentage of Boron			
Mixtures as calculated.....	0.00	0.25	0.50	1.00
Analysis of ingots.....	0.00	0.20	0.40	0.80

The ingot made of remelted soft steel without boron addition was readily forged, whereas the ingots with boron became brittle in proportion as the percentage of this element rose. Moreover, piping became more pronounced, and for 0.80 per cent. boron it was 45 per cent. greater than in the ingot with no boron. Even with only 0.20 per cent. boron it was impossible to draw the ingot down for making test pieces. The first blows with the hammer developed cracks. Bending tests were also useless as cracks would form immediately. Heat treatment improved this evil somewhat, but the indications were that for practical purposes boron additions to soft steels were of no value. While the hardness obtained is in itself of great value, the brittleness accompanying it precludes the use of boron for high grade steels.

*Tests with Cast Iron.*—This is a new field, and naturally would only be valuable for special cases where a higher cost per pound is of no special object. A first class grade of cast iron, for machinability and strength, was selected for the melting tests, and the same boron additions enumerated previously were made in the crucible melts. The analyses for boron indicated the same recovery, except that in the last case the figure was 0.85 instead of 0.80 per cent. as in the steel test. Hardness and brittleness were observed in rising proportion here also, as the percentage of boron increased. With an 0.85 percentage of boron even the hardest files would no longer touch the metal and from a good, close grained iron in the remelt free from boron, all evidence of a grain structure had disappeared in the piece with the high percentage. It had become practically a white iron. The analyses which show this plainly are:

No.	Boron added, per cent.	Boron found, per cent.	Silicon, per cent.	Graphite, per cent.	Combined carbon, per cent.
1.....	0.00	0.00	2.48	2.38	0.94
2.....	0.25	0.20	2.42	1.67	1.45
3.....	0.50	0.40	2.44	1.95	1.96
4.....	1.00	0.85	2.30	1.14	2.17

Boron evidently has the effect of throwing carbon into the combined form very readily, as with a silicon content of 2.30, so high a combined carbon content as 2.17 is exceptional.

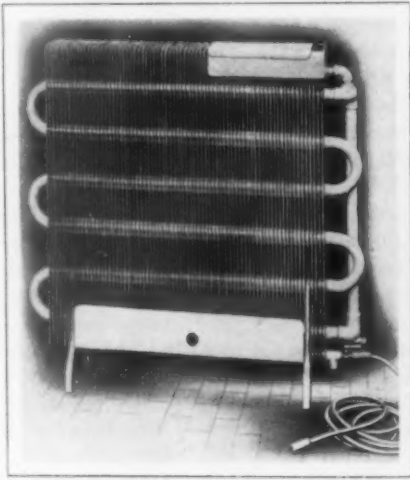
As boron is understood to be valuable in preventing acid attack, a series of tests was made

along this line, but the results show very plainly that this is not the case with cast iron, and hence boron will not prove valuable for either improving the quality of cast iron or increasing its resistance to acid attack. It may be of interest to state that the tests in question were made with hydrochloric, nitric and sulphuric acids of various strengths, both hot and cold, and in varying degrees of concentration. While some good effects were obtained, the bad effects on the mechanical properties outbalanced them greatly. For instance, with concentrated hydrochloric acid at room temperatures and without heating, a period of 43 hours reduced the castings free from boron 50.9 per cent. by weight; the 0.20 per cent. boron castings, 32 per cent.; the 0.40 per cent. boron castings, 15 per cent., and the 0.85 per cent. boron castings as little as 4.2 per cent. As this iron, however, is almost white, it is of little practical value. Nitric and sulphuric acids concentrated, either hot or cold, show heavy losses all along the line, whereas dilute sulphuric acid shows little action under the same conditions, whether boron was used or not. Further tests with molten alkalis indicate heavy corrosive action; hence even here the use of boron is not of value.

This information is given particularly so that useless further work may not be undertaken with this element in connection with iron. R. M.

Gas-Heated Hot-Water Radiator

A gas-heated hot-water circulating extended-surface radiator has been put on the market by the Copper Coil Radiator Company, 19 Cliff street, New York City. The heat is generated by means of a gas burner of the Bunsen type, especially constructed for the work, and the flame is immediately beneath one length of the copper pipe of which the circulating coil is made. The different sections of



Gas Heated Radiator with Copper Coil Having Galvanized Steel Fins

the copper pipe have driven tightly upon them galvanized sheet metal fins to increase the surface exposed, close contact of the added surface aiding in the transmission of heat from the coil to the fins. The pipe sections are connected into a continuous coil by means of brass return bends. At the top of the coil there is an expansion tank and at the bottom a drain cock. The radiator is for use where a gas supply is available, say, in an isolated office building of a factory. It has one-eighth the weight of a cast-iron radiator and also occupies considerably less space for the same amount of surface exposed. The radiator may be supplied with an ornamental screen covering.

## OXYGEN IN STEEL\*

## English Acid and Basic Product Compared—Hot-Worked Metal High in Oxygen

BY J. A. PICKARD AND F. M. POTTER

The following work was undertaken as part of a systematic examination of the oxygen content of commercial steels with a view to collecting trustworthy evidence as to the amount of oxygen normally to be expected in good class material, and the limits within which it is desirable to restrict this element.

The method of estimation, which consists in heating the steel in a confined volume of hydrogen with a weighed boat containing phosphorus pentoxide and measuring the increase in weight of the boat, has been used throughout and has fully confirmed the opinion arrived at as to its convenience and reliability. The determinations were in most cases carried out in duplicate by the two authors independently.

All the steels examined were made by either the acid or the basic open-hearth process, and, as far as can be judged from the analyses, they were generally of excellent quality. In the following tables the samples are arranged in order of carbon content. The actual figures obtained for oxygen in duplicate analyses are given in the last two columns, and show the amount of agreement ordinarily obtained when using this method. Six of the results are reprinted from the former paper (Carnegie Scholarship Memoirs, 1913, page 70) and are included here for ease in reference.

Table 1—Acid Open-Hearth Steel

Sample	Carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Sulphur, per cent.	Phosphorus, per cent.	Oxygen, per cent.		
1	0.67	0.73	0.95	0.035	0.027	0.004	0.004	Mean—
2	0.79	0.65	0.210	0.030	0.050	0.020	0.021	C., 0.87
3	0.93	0.68	0.035	0.031	0.027	0.007	0.006	O., 0.011
4	1.05	0.62	0.024	0.033	0.022	0.012	0.016	
								Mean—
5	1.18	0.65	0.056	0.027	0.025	0.005	0.006	C., 1.35
6	1.33	0.42	0.140	0.030	0.024	0.004	0.007	O., 0.007
7	1.55	0.49	0.100	0.027	0.026	0.010	0.012	Mean
								of all—
								O., 0.0096

Table 2—Basic Open-Hearth Steel

Sample	Carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Sulphur, per cent.	Phosphorus, per cent.	Oxygen, per cent.		
8	0.10	...	...	...	...	0.038	0.036	
9	0.14	0.35	0.020	0.033	0.018	0.010	0.011	
10	0.20	...	...	...	...	0.031	0.028	
11	0.23	0.70	...	0.060	0.026	0.013	0.014	Mean—
12	0.26	0.49	0.120	0.030	0.031	0.003	0.006	C., 0.25
13	0.30	...	...	...	...	0.030	0.027	O., 0.021
14	0.32	0.62	...	0.051	0.020	0.040	0.041	
15	0.33	0.62	...	0.057	0.025	0.024	0.021	
16	0.35	0.56	0.182	0.027	0.020	0.005	0.008	
17	0.41	0.52	0.026	0.032	0.023	0.019	0.014	
18	0.44	...	...	...	...	0.029	0.025	
19	0.54	0.69	0.985	0.022	0.024	0.003	0.003	Mean—
20	0.55	0.97	...	0.055	0.011	0.016	0.017	C., 0.52
21	0.55	...	...	...	...	0.020	0.020	O., 0.021
22	0.61	0.74	...	0.053	0.021	0.038	0.044	
23	0.66	0.65	0.100	0.033	0.052	0.005	0.006	Mean—
24	0.75	0.38	0.025	0.025	0.022	0.025	0.026	C., 0.81
25	0.82	0.67	0.096	0.030	0.028	0.004	0.007	O., 0.011
26	1.00	0.67	0.036	0.016	0.025	0.006	0.007	Mean
								of all—
								O., 0.0189

## CONSIDERATION OF RESULTS

It had been expected from the results published in a former paper that it might be possible

to discover some relationship between the oxygen and the carbon content, but the results quoted lend but little support to this theory. Samples 9 and 12, containing 0.14 and 0.26 per cent. of carbon respectively, contain only 0.011 and 0.005 per cent. of oxygen, while No. 14 with 0.32 per cent. of carbon contains 0.041 per cent., and even No. 22 with 0.61 per cent. of carbon also contains 0.041 per cent. of oxygen. One most important conclusion to be drawn is that it is possible to make all kinds of open-hearth steel, even low-carbon low-silicon basic (No. 9), practically free from oxygen—containing only 0.010 per cent. or under. That some steels are made containing more than that amount is, however, abundantly shown by the other results, and it is to be observed that the cheaper steels contain higher oxygen.

Acid open-hearth steel is generally admitted to be of better quality than basic open-hearth, and it has been suggested that this is due to the higher oxygen content in basic steel. In the foregoing tables all the high-oxygen steels (that is, over 0.020 per cent.) except one (No. 2) are found in the basic group, so that the evidence does support the conclusion that basic steel is higher in oxygen. It is to be noted, however, that only two of the basic steels are higher in carbon than the lowest of the acid group, and no marked difference is to be noted in those samples comparable in carbon content; indeed No. 2, an acid steel, is higher in oxygen than Nos. 23, 25 and 26, which are basic.

An interesting question is raised by the fact that the samples that must have received most hot-working are all high in oxygen. Nos. 14 and 15 were taken from two fishplates, No. 22 from a rail, while the other samples were from fair-sized billets. The possibility that the oxygen content may vary after the steel has solidified has, so far as the authors are aware, not hitherto been considered. It must be borne in mind, however, that these steels, as judged from their other constituents, were not of the very highest quality, and that Nos. 8, 10, 13, 18 and 21, which are all high in oxygen, were of cheap make. It is hoped to investigate the influence of hot-working on the oxygen content in a subsequent paper.

## Japan's Imports of Iron and Steel

A writer in the Tokio Economist calls attention to the rapid increase in Japan's imports of iron and steel. In 1908 total exports were 330 million yen (1 yen = 49c.) and imports 490 million yen, one-ninth of the latter being iron and steel. In 1913 the total exports were 640 million and the imports 720 million yen, iron and steel representing one-tenth of the imports. The increase in the last decade is shown by the following table:

1901.....	19,970,000 yen	1911.....	54,757,000 yen
1902.....	18,810,000 yen	1912.....	71,922,000 yen
1903.....	21,931,000 yen	1913.....	69,624,000 yen
Mean.....	20,237,000 yen	Mean.....	65,430,000 yen

Thus in a decade the imports of iron and steel have more than trebled. The increase in six years was 157 per cent., and in 10 years 258 per cent. Imports of ore totaled 51,800 tons in 1903 and 280,200 tons in 1913. The value of the imports of locomotives, steamships and machinery was 10 million yen in 1903 and 40 million yen in 1913.

Based on a population of 60,000,000 the requirements of iron per capita are 2.60 yen per year, of which Japan herself produces only 17 per cent. No other nation imports 83 per cent. of its requirements of iron and steel. The writer adds that the iron-ore deposits of Japan, known to the geological survey, amount to about 36,000,000 tons and that in this estimate only the best deposits having about 50 per cent. of iron are considered.

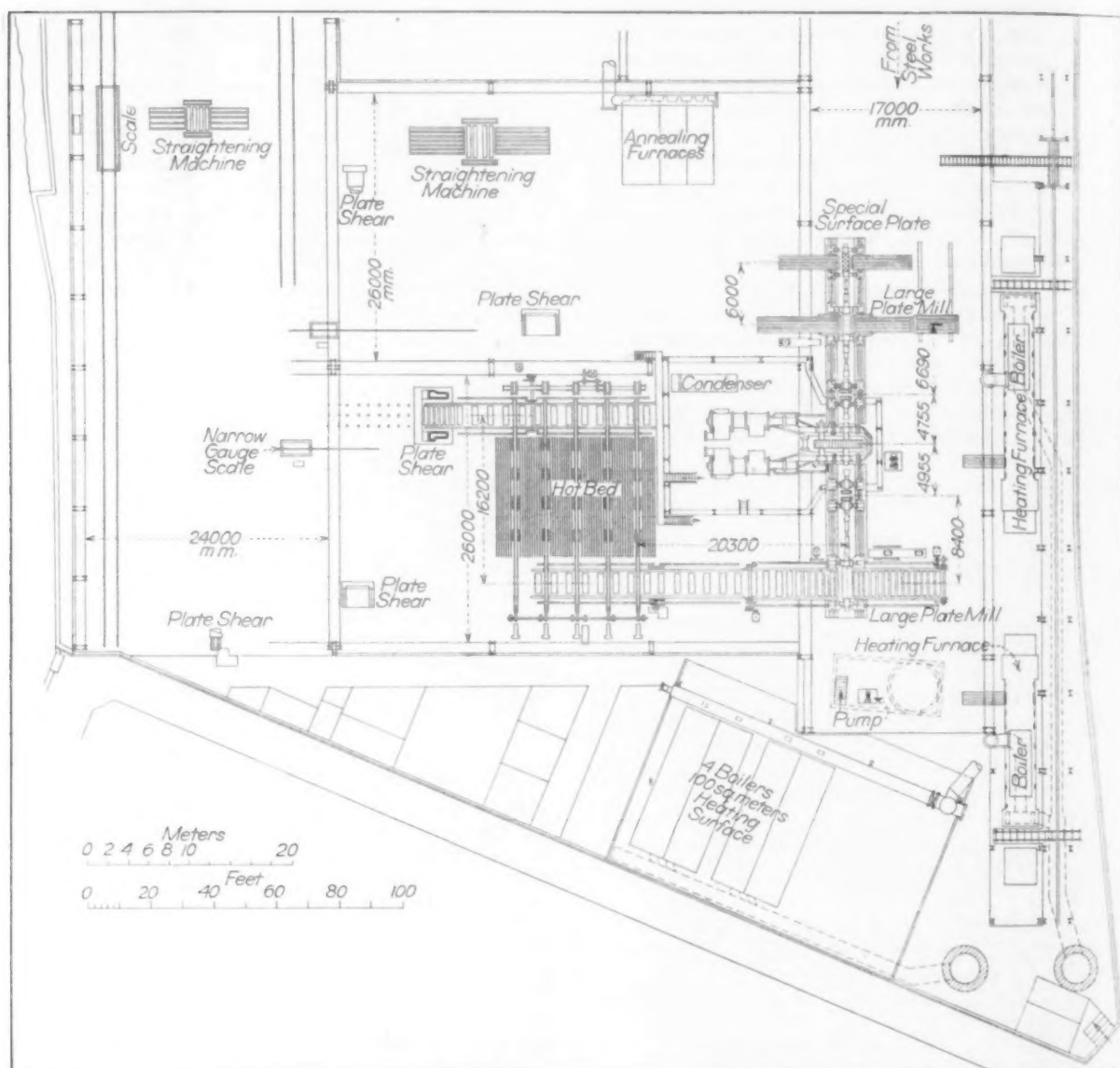
\*From a paper prepared for the abandoned fall meeting in Paris of the Iron and Steel Institute.

## A NEW GERMAN PLATE MILL

Three Stands, Two Three-High and One Two-High, Driven by a Reversing Engine

A new plate mill, with several novel features, recently built at the plant of the Bremerhütte A.G., at Giesweid, near Siegen, Germany, is described in *Stahl und Eisen*, June 18, 1914. As may be seen from the plan the mill has three stands of rolls, all driven by one engine. On one side of the engine is a three-high mill, 950 mm. (37.4 in.) diameter, and 3290 mm. (129.5 in.) long. On the other side is a second three-high mill next to the engine with rolls 750 mm. (29.5 in.) diameter and 2020 mm. (79.5 in.) effective length. Adjoining this is a slow

mills in relation to the engine has worked very well. It allows the mill couplings to be disconnected on either side for roll changes, or necessary repairs and one mill can therefore be kept running. The screw-downs of the three mills are operated electrically, as is all the auxiliary machinery, including the manipulator in front of the rolls. The smaller middle roll of the two three-high stands is balanced by counterweights which are operated automatically with the roller tables. The arrangement is that the counterweights cause the middle roll normally to press against the upper roll. As the tables are raised they carry the weights with them and cause the roll to press against the lower roll. Due to this dependence of movement of the middle roll and the tables it is no longer possible



Plan of the New Plate Mill of the Bremerhütte, Giesweid, Germany

moving two-high mill with rolls 700 mm. (27.5 in.) diameter and 1800 mm. (70.8 in.) effective length, for the production of special surface plate. The rolls are commanded by a 40-ton crane. All the mills are, therefore, driven by the one engine, which is a reversing steam engine. One reason for the choice of a reversing engine is that, with slow rolling during the last pass, the work of straightening is greatly reduced, and in many cases may be dispensed with. Such rolling is easily possible with the type of engine chosen, but not with the usual constant running fly-wheel engine.

Up to the present time this arrangement of the

to roll steel underneath the tables, as was formerly the case. In front of the front roller table of the smaller three-high mill is a traveling roller table, which serves to carry the finished plate over to the two-high mill. The mill is provided with annealing furnaces, shears, scales, etc., arranged as shown in the plan.

The main reason for choosing a reversing engine was that by doing so the time that the mill is running without steel in the rolls can be lessened. Using a reversing engine one is in a position to take hold of the ingots or slabs quietly and without sudden stoppage of the mill, and when they



have been somewhat elongated to put them through the mill quickly.

The greatest speed of the rolls is found during the last passes. The engine is at rest not only between the rolling of the different slabs or ingots, but also usually between the various passes, and so is actually at work for only a relatively small part of the time. Notwithstanding the fact that such engines must be of large capacity they are more saving of steam than fly-wheel engines. For these reasons such engines have been recently introduced for driving three-high mills and are in operation at Dillingen, Rothe Erde, Weidenau, and are being installed at other mills. They can run in one direction continuously if desired, or they can be reversed. The latter is generally done during the first passes, and as soon as the plate has reached a certain length the mill is used as a three-high. If there is trouble with the raising or lowering of the tables the mill can be run as a simple two-high.

The following results may be given as an example of the practice at the Bremerhütte, with this kind of engine: Time of test, 8 hr. 23 min.; 133 plates rolled with a total weight of 127 tons. Seventy-four of these were from 0.156 in. to 0.234 in., and 26 from 0.273 in. to 0.429 in. thick. The average hourly output was 15.25 tons, the steam consumption 15,200 lb. per hour. The largest hourly consumption was 17,970 lb. and the greatest consumption 7540 lb. in 20 minutes. In the latter case all three stands were rolling plate. The steam consumption per ton was 992 lb. which, in view of the large amount of thin plate rolled, was considered very satisfactory.

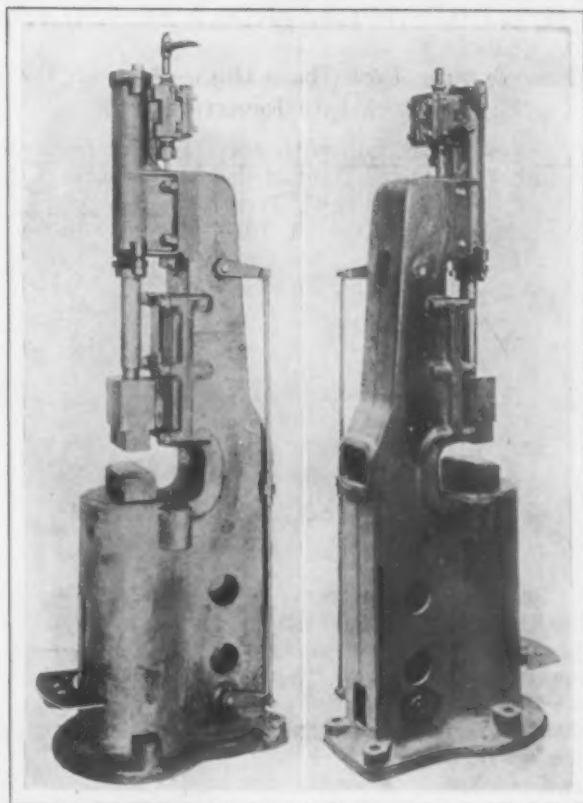
G. B. W.

### Pneumatic Hammer of Wide Application

With a view to eliminating blacksmithing or hand forging expense in the handling of heavy work in the making of lathe and planing machine tools, producing forged parts, making plant repairs and turning out miscellaneous pieces in plants of every description which now consume the time of a man and a helper, H. Edsil Barr, 922 State street, Erie, Pa., has brought out a pneumatic hammer. The hammer is built in two sizes, the larger of which is illustrated, and it is distinctive in that no belts or pulleys, springs, rubber cushions, leather straps, wooden beams, band brakes, etc., are required. It can also be placed wherever an air pipe or hose can be run, and this portable feature enables it to be used for tool dressing on contract operations. In general appearance the hammer resembles a small sized steam hammer and pressure in a cylinder is employed to lift and throw the ram, compressed air at a pressure of from 80 to 100 lb. being used.

The hammer consists of a solid cast anvil with an integral box housing supporting the cylinder. The frame, which is at the back of the machine, carries planed guides for the ram shoe, thus keeping the front and sides free from obstruction and enabling stock which makes a large angle with the dies to clear the frame. The piston and its rod are made in one piece from special oil treated steel, and the ram and the guide shoe are forged from a single piece of high carbon steel. The dies, which have hardened faces, are readily removable for the use of special forms of dies.

The valve is of the D slide type with a special arrangement of ports that is relied upon to give a quick and readily controlled action. The ram is always at the upper end of its travel and the blow is struck by depressing the foot treadle at the front.



Front and Rear Views of a New Pneumatic Hammer Showing the Arrangement of the Working Parts and the Massive Frame

With a full drop of 10 in. and the full air pressure behind the piston, about 2500 ft.-lb. of energy is secured, and the force of the blow can be varied as desired or a powerful squeezing action secured. The amount of pressure required is said to be the same as that for a sewing machine treadle. The foot treadle moves rapidly and it is pointed out that with a few days' practice an operator can strike continuous blows which vary in intensity as may be desired. An air-cushioned stoppage is relied upon to prevent the piston from striking the head of the cylinder.

The amount of floor space required measures 14 x 24 in. and the over-all height of the hammer is 66 in. The tool weighs 1200 lb., and the maximum air consumption is 10 cu. ft. per min. The maximum size of stock, which the hammer is designed to handle, is 2 in. square, although 3-in. stock can be handled where the reduction required is not too great. If desired, the hammer can be equipped for light die stamping, forming and embossing, and centering screws for locating the lower die are furnished. A smaller size of hammer, having approximately half the capacity, is built for tool-room work, copper drawing, jewelry manufacturing, etc.

### Cincinnati Business Men's Club

The annual election of the Business Men's Club of Cincinnati, Ohio, was held November 10. The following directors were elected for the ensuing year: F. C. Colwell, F. W. Galbraith, Jr., Clifford Miller and B. H. Kroger. In the evening a banquet was served which was attended by over 800 members of the club.

In accordance with custom, the directors met on the following evening and selected officers as follows: President, William P. Rogers; first vice-president, George W. Weedon; second vice-president, John L. Shearer; secretary, Morris W. Wickersham; treasurer, George G. McMorris. James W. Brannin was re-elected manager of the club. E. W. Edwards, president Edwards Mfg. Company, is the retiring president of the club.

## ROLLED STEEL ROLL SHELLS\*

### How the Wearing Surfaces of Grinding Mills are Manufactured

BY JAMES C. H. FERGUSON†

The application of steel shells as wearing parts in the various types of grinding mills is comparatively new, but the purely mechanical features of their manufacture is easily accomplished by the use of ire-rolling mills which for many years previous had been used for making locomotive driving-wheel and car-wheel tires. Shells which have given good satisfaction in actual operation have shown the following analysss in the heats from which they were produced:

Carbon, per cent.....	0.70	0.73	0.78
Phosphorus, per cent.....	0.035	0.029	0.015
Sulphur, per cent.....	0.022	0.018	0.028
Manganese, per cent.....	0.741	0.786	0.745
Silicon, per cent.....	0.253	0.252	0.258

#### MANUFACTURE

Briefly, the process of manufacture of roll shells is this: A cylindrical steel ingot is cast about 7 ft. high. When the metal is cold he ingots are sliced cold in a lathe into a number of sections or billets. Cold slicing is a vastly superior method as it gives an opportunity t omake a thorough examination of the center of the billet. Only those porions are used which are free from impurities.

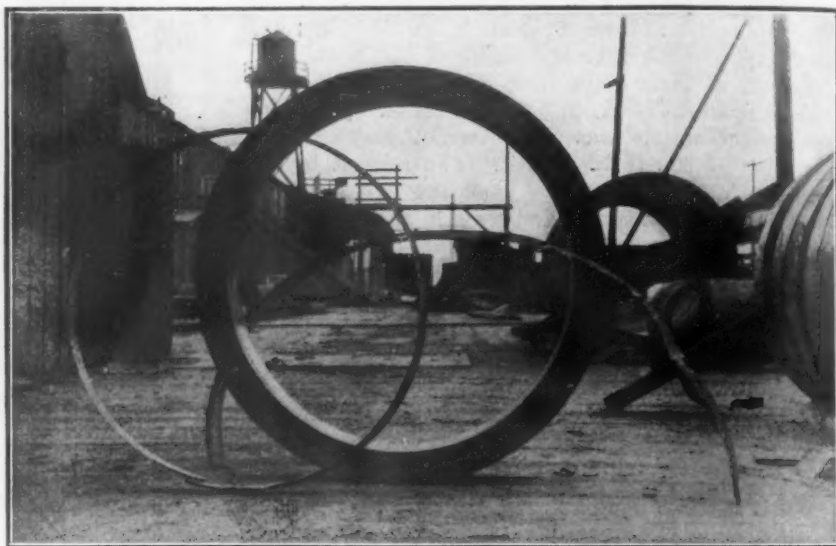
The billets represent the weight of the finished product desired, plus the proper allowance for loss in heating, forging and rolling, and for machining afterward if the shell calls for machine work. The billet is heated and forged out roughly and flattened under a steam hammer to the approximate diameter and face desired. A hole is punched through the center in the ame operation and then, at the same heat, "beaked" on the horn of the anvil; this means hammering the rough ring thrown over the horn, producing an increase of the outside and inside diameters, and giving the ring the proper ratio, roughly, of diameter to face required. These rough rings, after being thus forged, are again placed in a heating furnace and the temperature raised to the proper degree for rolling.

A modification of this hammering process of the billets, is used by one of the manufacturers who has the most recent and up-to-date plant, and who, after heating the billet to the required temperature, works it down under a 5000-ton hydraulic press, which gives the metal a good reduction. During this pressing, which is done in three operations, the billet is flatened, a hole is punched in the center, and the rough ring prepared for the rolls, similarly, but unquestionably more thoroughly, than by hammering the billet.

The rolling out of the shells to the desired size is done on a tire mill, where they are revolved through pressure rollers, either in a horizontal or verical plane. During this operation all faces of the shell are subjected to a very high hydraulic roll pressure, which insures a thorough reduction of the

metal, giving it the necessary work to develop an ideal structure for the severe service to which roll shells are usually subjected in actual use. In this rolling the inside and outside faces and he two sides of the shell are engaged at the same time, thereby increasing the diameter of the shell by squeezing out and lengthening its circumference until the desired size is obtained, both as regards diameter and face.

A hard skin is left due to the quicker chilling of the metal on the periphery, which is very useful in grinding, and enhances the life of the shell considerably. The inside of the shell is left rough if it is to be secured t othe center of the rolls by wooden wedges for wet grinding. If he bore of the ring is to be machined either straight or tapering, proper allowance is left for that purpose on the inside, but the outside or wearing face of ring, being finished practically smooth by the rolling operations, should preferably be left in that condition, by reason of the advantage mentioned.



Chilean Mill Tires Worn So Thin that Crescent Shaped Piece Was Pulled Out By Hand From Its Circular Shape

A mass of metal thicker than 5 in. cannot be sufficiently worked by the pressure of rolls, unless the rolls can be made very much more powerful than those in use at present, particularly when the combination of rolling and pressing naturally has is relative limits. Then again, the width, regardless of thickness, would have its limit at about 15 or 16 in., because a very wide mass, even thinner than 5 in., would experience the same difficulty in being thoroughly worked. It may therefore be assumed that shells over 5 in. in thickness and wider than 16 in. cannot be rolled advantageously in a tire mill and produce homogeneous and dense metal, which will give good service and wear. The following gives the limits of sizes for rolling as used in the practice of one of the largest tire manufacturers in the United States: Roll shells 8 to 10 in. wide, 108 in. outside diameter by 3 in. thick; over 10 to 16 in., or under, 68 in. outside diameter by 3 in. thick.

Shells over 16 in. wide and thicker than 5 in. and weighing say 5000 lb., or over, are produced to the best advantage under a hydraulic forging press of adequate power, as a strictly forged, instead of a rolled product. Sufficient stress cannot be laid upon the necessity of thoroughly working the metal in these forgings all the way to the center by the use of machinery of this kind, which is sufficiently heavy and powerful to perform the necessary forging operation and is better able to do so than rolls. The

\*From a paper presented to the American Institute of Mining Engineers.

†Monadnock Building, San Francisco, Cal.

writer is convinced that most of the cases of uneven wear in roll shells of extreme widths, where not due to improper setting or improper mill feeding, or both, is largely owing to the fact that the metal is not of uniform density, resulting from being worked in a tire mill, which was too light for the heavy and thick section passing through the rolls.

#### LIFE OF SHELLS

The following examples taken from users of roll shells in the widely separated states of Montana, Colorado,

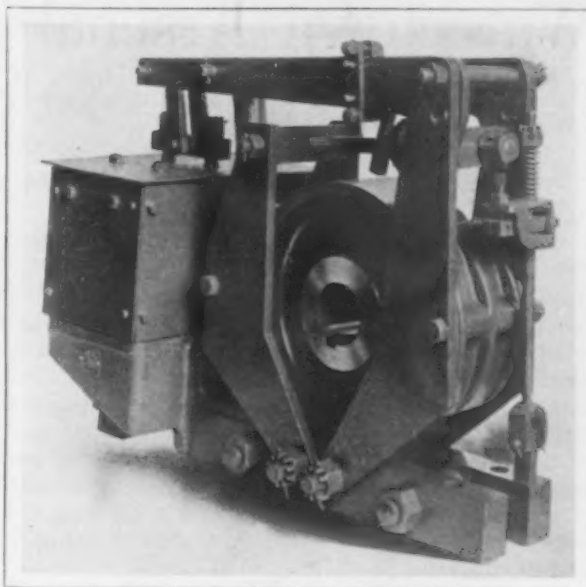
The accompanying illustration is an excellent example of how thin shells should wear in actual operating practice in order to be considered as most efficient and satisfactory. It shows rolled tires used on one of the best types of Chilean mills, also worn down so thin that the half-round or crescent-shaped piece shown was pulled out by hand from its circular shape. The example proves more than any amount of elaborate tests or record keeping, that the material of which these particular shells and tires was made, was homogeneous and durable as well as tough, the latter being indicated by its strength and resistance to breaking, even when worn to the thin section shown.

#### Automatic Solenoid Brake for Cranes

The General Electric Company, Schenectady, N. Y., has placed on the market an automatic solenoid brake for crane, hoist, lift bridge and similar service. A complete line of standard sizes for both alternating and direct current applications is built, and all sizes are designed to be mounted on the floor. The special features embodied in the construction of the brake include automatic adjustment of the solenoid air gap and the clearance of the brakeshoes, and the employment of a floating top core type of solenoid. The force that operates the brake is transmitted to the upper ends of the yokes through horizontal levers, which are attached to the movable element of the solenoid by links. Energizing the solenoid causes the movable element to be forced up to the end of its travel and thus release the brake, which is set by gravity when the coil is demagnetized.

The adjustment of the air gap of the solenoid, to keep the distance between the upper or floating core and the lower ones constant when the brake is set is made by a ratchet wheel and an adjusting rod. The pawl is designed so that when the distance between the upper and lower cores increases beyond a certain limit, it will engage with a tooth of the ratchet wheel and rotate the latter slightly when the movable element of the solenoid is forced up by the magnetic field to release the brake. As one tooth on the ratchet wheel corresponds to a slight variation in the distance between the upper and lower solenoid cores, it is pointed out that the adjustment is very close.

The shoe clearance adjustment is provided by a rod attached to one of the base bars passing through a bracket bolted to one of the yokes. In this bracket there is a slot for a spring clamp attached to the rod, and as the shoes wear, permitting the yokes to approach slightly nearer to the wheel when the brake is set, the spring clamp is moved a corresponding amount by the bracket, as these two parts are in contact when the brake is applied. The lever pin can be changed to one of the other sets of holes designed for it or one or more of the weights on the movable element of the



An Automatic Alternating-Current Solenoid Brake Recently Developed for Use with Lineshafts, Cranes, Hoists, Etc.

solenoid can be removed when it is desired to increase the braking effect.

A single-acting oil dashpot is supplied with the larger sizes, with a view to preventing any rebound of the movable element of the solenoid when the brakes set and thus give a smooth application. The use of a floating top core is relied upon to prevent a severe blow from being struck by the movable element hitting the floating top core, when the former reaches the upper limit of its travel, as the latter, which is held in place by magnetism only, yields slightly.

#### An Unusual Test of Corrugating Rolls

One of the heavy duty roll corrugating machines at the plant of the Youngstown Sheet & Tube Company, which were built by the O. O. Poorman Company, New Bremen, Ohio, was recently subjected to



A Steel Wrench with a 1/2-In. Handle and 5/8-In. Square Jaws After Passing Through a Set of Corrugating Rolls with a Pack of Metal Sheets

a rather severe and somewhat unusual test. In some unknown way a steel wrench was deposited in a pack of sheets which were to be corrugated and went through the machine with them.

Although the pack of sheets alone was all that the machine was guaranteed to handle, the condition of the wrench after its involuntary trip through the rolls is shown in the accompanying illustration. The handle of the wrench was made of 1/2-in. round steel, while the jaws are of steel 5/8 in. square. A perfect 2 1/2-in. corrugation was put in the wrench, this being accomplished, it is stated, without any injury either to the machine or the dies.

The annual meeting of the Compressed Gas Manufacturers' Association, Inc., will take place January 18, 1915, at 2.30 p.m., at its headquarters, 25 Madison avenue, New York City. Dr. Hugo Lieber is president and John J. O'Rourke, secretary and treasurer.



# Watertown Arsenal Time Study and Bonus

## Favorable Report of the Ordnance Bureau —Adverse Congressional Report Based on Testimony, Without a Visit to the Works

WASHINGTON, D. C., November 17, 1914.—Some significant results of the application of scientific shop management to the ordnance plants of the War Department, and especially to the Watertown Arsenal, are embodied in the forthcoming annual report of Brigadier-General Crozier, chief of ordnance. These results are of special importance at this time in view of the efforts that are being made in Congress by organized labor to secure the passage of the so-called Deitrick bill, which is intended to compel the Government to abandon all shop systems involving the use of premiums as rewards for special efforts on the part of workmen.

### PREMIUMS TO WORKMEN AND FOREMEN

The Ordnance Bureau undertook the introduction of improved methods of shop operations in the various arsenals three years ago. The bureau first adopted the time study feature. From the outset the introduction of this system has been steadily opposed by the leaders of organized labor; nevertheless the advantages both to the Government and to the employees, General Crozier states, "have continued and increased" and especially during the past year the time study and premium features have been extended. Figures submitted in the report speak more eloquently than any argument regarding the advantages to the workmen of the premium plan. Of machinists employed, 167 in the month of August, 1914, for example, did 54.39 per cent. of their work under premium and received increased wages amounting to 28.18 per cent. for such work. Eleven molders worked 77.51 per cent. of the time under the premium system and earned an increase of 29.27 per cent. of their regular pay while so employed. Similar figures are presented for machinists' helpers, carpenters, carpenters' helpers, blacksmiths, blacksmiths' helpers, chippers, screw makers, furnace helpers, steam-hammer drivers, painters, and skilled and unskilled laborers in various departments.

General Crozier says that a system is employed of paying premiums to the foremen, depending upon the number of their men who are given work upon premium jobs and upon the amount which is made by the men. There was paid to eight foremen in August an average of about 10 per cent. of their regular wages. Including this last sum, the total paid out in premiums at the arsenal in August was \$2657.29, and the time spent in work under the premium system was 26.25 per cent. of all the working time at the arsenal in that month.

### OPPOSITION OF LABOR UNIONS

The labor organizations have shown strong hostility to the system in practice at the Watertown Arsenal and have exerted their power to stop it. Bills have been introduced in Congress to this effect and have received the favorable report of some committees. A great many objections have been urged, some of which relate to the economical and other advantages realized by the Government and some to the effect upon the employees. The failure of advantage to the Government is not given by any committee of Congress as a reason for action against the system. The advantage has been so completely and frequently demonstrated, General Crozier as-

serts, that it need not be dwelt upon now. The alleged disadvantage to the employees, who are held by labor organizations to be under their protection, has included two principal items: First, an employee of high grade, such as a machinist, is not given opportunities to earn premiums under the system as numerous and profitable as are those which are given to machinists of lower grade, the accompanying allegation being made that an object of the system is to do away with the high-grade machinist and substitute for him an abnormally stimulated man of lower grade, developed to great speed along one line only, and of less general value to industrial work than the higher-grade man whom he is intended to displace. The figures at the Watertown Arsenal obviate any necessity for discussing this phase of the question. At the arsenal high-grade machinists receive \$3.25 per day; low-grade machinists, \$2.56 per day, and certain machine operators \$2.40 and \$2.24 per day. During a certain recorded period the high-grade machinists received for their increased earnings under the premium system an average of \$426.14 each, equivalent for each one of them to 121 days' pay. The \$2.56 men received an average of \$144.74 each, amounting to 56 days' pay; and there were paid to the \$2.40 and \$2.24 machine operators sums amounting, respectively, to \$117.22 and \$32.74 each, or 49 and 14 days' pay. The great relative advantage for the high-grade man is thus seen at a glance.

### OVERSPEEDING OF WORKMEN

The second charge made is that the system involves the undesirable speeding up of men, stimulated by reward and punishment, to their resulting physical, mental and moral detriment. When this charge was first made, at the beginning of the practice of the system in the Ordnance Department, it was speculative only and based upon estimates of the practice which were adduced from the writings of advocates of the system; and it could be met only by arguments to the effect that these writings were misread and that the department had no intention of inflicting any of the evils apprehended on the workmen. The features objected to have now been in practice at the Watertown Arsenal for something over three years, and in examining the charge of disadvantage to the employees the bureau is no longer required to deal with speculations and premises, but can appeal to a rather extensive experience, which only needs investigation for its interpretation. An investigation worthy of the name has been made by one body only—a special committee appointed by the House of Representatives about two years ago, while the practice of the system in this department was still quite new. This committee visited Watertown Arsenal and other establishments and took a great deal of testimony. As a result of this extensive investigation the committee did not find, and did not say that it found, anything to the disadvantage of the employees in practice anywhere in the Ordnance Department. It stigmatized certain practices as undesirable, but did not state it found these practices in existence at any of the arsenals, and General Crozier declares there is no difficulty in joining heartily in its statements in regard to them. It reported that the whole subject

was at that time too new for definite conclusions in regard to it to be made, and it recommended that there should be no legislation by Congress upon the subject at that time.

#### HOSTILE REPORT OF HOUSE COMMITTEE

Some time after the submission of this report of the committee, Congress created the Commission on Industrial Relations. Following the recommendation of the chief of ordnance, the subject of the practice of scientific management at the arsenals of the Ordnance Department was taken up by the commission, which now has it under examination, but has not yet personally investigated any of the arsenals. The Committee on Labor of the House has taken some testimony upon the subject of various hostile bills and has recommended legislation against the time study and premium systems, without visiting any of the arsenals. Certain statements made in the report of the committee are so erroneous, General Crozier declares, that they seem only to be accounted for by "the difficulty of appreciating verbal testimony without the acquaintance with actual conditions which could only be had by a visit to the establishment concerned." For instance, it is said in the report of the committee that the system "really operates to reduce the workmen's wages, not to increase them."

Referring to the inquiry of the Commission on Industrial Relations, General Crozier states that "it seems strongly to be desired that Congress shall not take action upon a subject to which the commission is devoting an important share of its attention, until after it shall have received the report and recommendation of this body which it has created as its agent."

#### LARGE TIME LOSS FROM ACCIDENTS

General Crozier submits statistics showing the operation of the liability act, under which the Government pays employees for time lost in the arsenals as the result of injury in the line of service. During the fiscal year 1914, 1518 out of a total of 6127 men were injured, of whom 566 were compelled thereby to lose time, ranging from a few hours upward. The amount paid on account of such disability during the year was \$18,631.29. General Crozier recommends that the law be amended so that the time lost through injury should not be full payment, but should "leave upon the employee a sufficient part of the burden to constitute an incentive for returning to his work with reasonable promptness."

W. L. C.

#### Coloring Patterns for Castings

A growing practice is noted among gray iron foundries to paint patterns to indicate the parts of a casting which are to be machined and the parts which are to be left rough. The point is that castings are sometimes spoiled because the molder does not know what part is to be finished in the machine shop. The parts of a pattern corresponding to parts requiring no machine work are tinted gray, while the parts which are to be machined are painted yellow, with the parts of the pattern indicating the location of cores in red. Colored cards are sometimes employed for each pattern, for the use of the pattern maker and sometimes for the molder, with the result that fewer castings have been ruined on account of their being gated wrong than was formerly the case. The plan has also eliminated the necessity of detailed instructions being given by the superintendent or foremen of the foundry. The plan has been used to some extent in steel foundries, but it is only recently that it has had any general use in gray iron foundries.

#### Hydraulic Jack of Unusual Construction

A type of hydraulic jack embodying in its construction features that are claimed to be entirely new has been developed by the Watson-Stillman Company, 190 Fulton street, New York City. Although the jack was designed primarily for emer-



A Recently Developed Hydraulic Jack Embodying a Number of Unusual Features in Its Construction

gency use on street railways, it is also adapted for use in shops and factories where lifting work is performed either occasionally or constantly. Among the special features claimed for the jack are the rotary movement of the claw, the including of the cylinder in the moving portion of the jack and the ability to operate the jack from any one of the four faces of the operating socket.

After the claw has been adjusted to the most convenient height for operation, it can be swung in a complete circle together with the cylinder without changing the jack's position or the level of the pump. The pump mechanism in this jack, it is emphasized, remains in a fixed vertical position, as the cylinder is the moving part of the jack instead of the ram, as is usually the case. This location tends to simplify the construction of the working parts and also gives a more compact arrangement. The jack is operated with a special oil which, in addition to serving as a lubricant, is relied upon to prevent rusting of the working parts and the possibility of freezing. It also has no harmful action on the leather rings with which the piston is packed. The valves are of the ball type, and when it is desired to lower the jack, the pressure is released by a key which operates a small needle valve. The operating lever which is curved is only 18 in. long and the maximum pressure can be obtained with the expenditure of only a slight amount of energy. The socket for the operating lever has holes on all four sides which enables the jack to be operated from practically any position.

The travel of the ram is 10 in. and the jacks, which are built in 5 and 10-ton sizes, are guaranteed to stand a 50 per cent. overload.

Pig-iron production in New South Wales in 1913, according to the annual report of the Bureau of Mines, was 46,563 tons, which is a substantial increase over 1912. The output of steel ingots was 13,608 tons. The bounty paid by the commonwealth government on the iron and steel made from ores mined in the state was £24,294, in 1913.

# The Lighting of Industrial Plants

## What Developments in Electric Lighting Have Done for the Factory— Application of the Modern Systems

— BY G. L. CHAPIN\* —

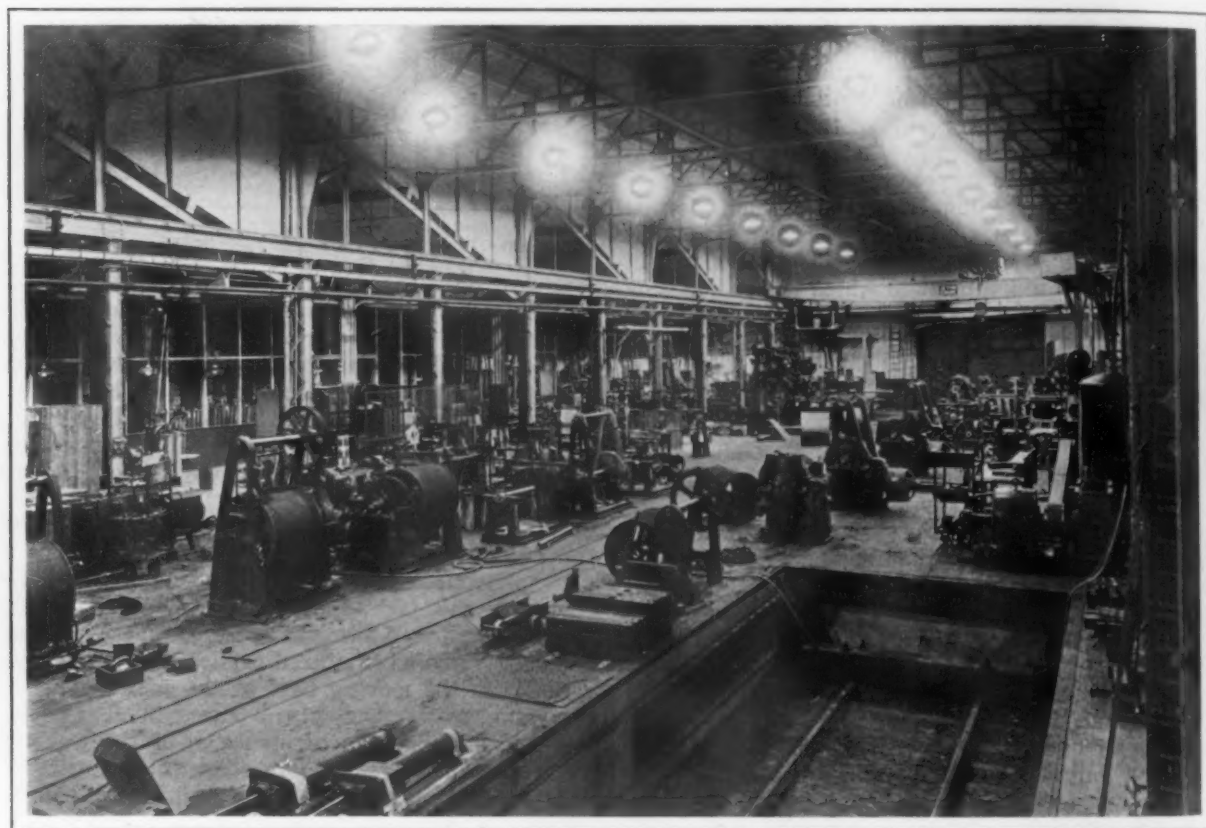
The average factory is so poorly lighted that the employee with keen eyesight cannot utilize it to the best advantage and is, for all practical purposes, partially blind.

Correct methods of artificial lighting do not necessarily imply additional expense. The installation of proper equipment has been known to reduce the monthly lighting bill in many cases where large amounts were being spent for light, much of which was wasted. As a rule light is considered as an ex-

and accurately over the longest period of time with the least effort. In applying good lighting commercially, however, the element of cost enters into the solution of every problem, and what might be good lighting in a watch factory would be light wasted in a foundry.

### LIGHT SOURCES\*

While enclosed and flaming arc lamps find extensive use in large areas, such as foundries, erecting



The assembling and erecting department of the Gurney Electric Elevator Company, at Honesdale, Pa., is lighted by 400-watt clear Mazda lamps in Holophane-D'Olier porcelain-enamel dome-type steel reflectors. These units are spaced on 15 x 25-ft. centers, above the path of the traveling crane, and hung about 20 ft. from the floor. The room is 50 x 105 ft. and the current consumption is approximately 1 watt per square foot. The photograph was taken at night and solely by the light from the lamps.

pense item, to be reduced whenever and wherever possible, and an insufficient amount is expended to produce good results. Good lighting is, in reality, the acme of economy; it increases production, reduces spoilage of material and the percentage of "seconds" and minimizes the number of preventable accidents. Its cost is but a small percentage of the factory payroll, and as the entire force is enabled to work at daylight efficiency during the hours when natural light is not available, its employment is amply justified from a commercial as well as an humanitarian standpoint.

### WHAT IS GOOD LIGHTING?

Briefly, it is that quality and quantity of light, either natural or artificial, which permits the highest visual acuity, i.e., the ability to see most clearly

shops, yards, etc., and various forms of tube lamps have been used to a limited extent, for general factory lighting the tungsten filament, Mazda, incandescent lamp is almost universally employed, and, as now manufactured, has proved very satisfactory from the standpoint of life, efficiency and color of light produced. In view of this condition, this article will consider the latter illuminant only.

For many years scientists and inventors have labored to perfect the incandescent lamp which Thomas A. Edison gave to the world thirty-five years ago. At times it has seemed that the highest possible point had been attained when new discoveries have been announced, some of which have opened up entirely unexplored fields of investigation, which resulted in a further increase in the amount of light obtainable for a given current consumption. While the cost of other commodities has steadily

\*The Society for Electrical Development, New York City.



risen, in most cases without any compensating increase in intrinsic value, electric lighting has just as steadily become cheaper and better.

Strange as it may seem, in view of the time, effort and money expended in developing the light source itself, but little attention was paid to the manner of its use. Various types of decorative shades have been used for years, but, although it was known that the incandescent lamp emits the larger portion of its light rays in a plane horizontal to its vertical axis, no attempt was made to gather up those rays, which were wasted, and divert them downward. With the introduction of the tungsten filament lamp, experiments in this direction were undertaken, with the additional incentive of shielding the eye from its dazzling brilliancy.

#### FIXTURES AND REFLECTORS

Three types of lighting fixtures are now available: the direct, the semi-direct and the totally indi-

rected downward, where it is required, and not be wasted upon the walls and ceiling; and second, in order to shield the eye from the high intrinsic brilliancy of the filament, which, when in the direct line of vision, interferes with the ability to see.

Both glass and steel reflectors in endless variety are available to produce any required distribution of light. Glass reflectors are not generally used in industrial lighting an account of danger of breakage and difficulty in cleaning. They have the advantage of inducing the workmen to use care in handling and undoubtedly reduce lamp breakage. Porcelain-enamel lined steel reflectors have been found to meet this rough service best, as they are easily cleaned and have a very low permanent depreciation factor.

#### METHODS OF INSTALLATION

Four methods of installation are in common use, and each has advantages which recommend it for



Localized-general system of illumination is employed in the machine shop of the Edison Lamp Works, Harrison, N. J., 80 x 240 ft. The ceiling, walls and posts above a point about 7 ft. from the floor are painted white and 100-watt clear Mazda lamps equipped with flat dome type enameled-steel reflectors are hung about 8 ft. from the floor and placed in relation to the machines to provide the proper direction and a fairly high intensity of illumination. General illumination is provided in spaces where there are no machines. The work-benches in the background are lighted by 60-watt clear Mazda lamps in enamel-steel bowl-shaped reflectors. They are spaced on 8-ft. centers and hung 3 in. in from the forward edge of and 5 ft. above the benches.

rect. The two latter types are inherently unsuited for use in the average industrial plant because the ceilings are usually dark-colored and dirty and broken by truss construction and skylights. The direct type only, therefore, is employed in general practice and the others may be eliminated from consideration. By direct lighting is understood that type of fixture and reflector of the lighting unit by which a majority of the rays emitted by the light source are directed at any angle below the horizontal.

No tungsten filament lamp should be used without a suitable reflector, and this statement applies particularly to the latest type of high-candlepower high efficiency Mazda lamps, which has recently been placed upon the market. There are two reasons for this: first, that all of the light emitted may be di-

rected downward, where it is required, and not be wasted upon the walls and ceiling; and second, in order to shield the eye from the high intrinsic brilliancy of the filament, which, when in the direct line of vision, interferes with the ability to see.

Local lighting consists usually of lamps suspended from the ceiling by cords and is a relic of the days when the only incandescent lamps available were the old style inefficient 16 and 32-cp. carbon-filament lamps. There are a few processes where its use is desirable at present, but it has many objectionable features, the principal one being that the average workman will use such a lamp between his eyes and the work, causing the iris to contract to the utmost limit. When the light is suddenly shifted and he gazes into the surrounding semi-darkness, a certain period must elapse before he can see clearly, and he continues his labor at great danger of injury and of spoilage of material.

General lighting was first introduced by the arc lamp, which is available, of course, only in units of high candlepower. With the advent of the tungsten filament incandescent lamp, which is now manufactured in a range of sizes from the 10-watt, giving nearly 8 cp. to the 1000-watt, giving approximately 1820 cp., general lighting became popular because of the high efficiency of light utilization made possible by the combination of these lamps with suitable reflectors.

Mill type buildings are usually divided by pillars into bays. The usual practice in general lighting is to place in the center of each bay one Mazda lamp of such size and with the proper reflector equipment to give the required intensity and distribution of light. Otherwise, the room is divided into imaginary bays or sections of equal size and treated in the same manner.

This method of lighting has many advantages: the initial cost for wiring is less than when a larger number of small sized lamps are used; machines, tables or work-benches may be re-located at will without changes in wiring, as the intensity of illumination is nearly constant at all points; the lamps are hung out of reach of the workmen and out of danger for breakage by accident; the entire area is bright and cheerful, and, as there are no blinding contrasts of light and semi-darkness, the workmen can see clearly and accurately at all times and in all directions.

Localized-general or group lighting is used in a number of industries where machines of the same class are operated in groups. Between these groups the floor space may be occupied by stock in course of manufacture, or by processes requiring little or no light. The lighting units are grouped with reference to the machines, and different sizes of units may be employed in the various groups to furnish just the intensity necessary for the work to be performed.

Combined localized and general lighting is employed where in certain operations a low intensity of general illumination is sufficient throughout the room, except for short periods when special operations are performed or adjustments must be made. These exceptions are typified by the setting of the core and cleaning of the mold in the foundry; the periodical setting-up and inspection of automatic screw machines, boring mills, milling machines, planing machines, etc.

There are two methods of installing the lamps used for the supplemental lighting: First, lamps equipped with intensive or focusing type reflectors are hung from drop cords over each machine or at convenient intervals so that they may be lighted when required and extinguished when no longer necessary. Second, screw or plug receptacles are installed at frequent intervals on the walls, outlet boxes or flush plug receptacles in the floor, or sockets hung from drop cords, into which a hand lamp, equipped with suitable reflector and sufficient length of cord may be inserted. The first method labors under a disadvantage, in that the workmen will not always extinguish the light when it has served its purpose, whereas under the second method, the light is automatically extinguished when it is removed for use elsewhere. Hand lamps should be provided with a wire guard to prevent breakage, and a hook by which it may be hung at any convenient point, thus leaving the workman with both hands free.

The predetermination of the minimum amount of light necessary for proper illumination, the selection of equipment to produce it, the calculation of spacing, hanging height and size of units, and the checking, by actual measurement, of results obtained, constitute the science of illuminating engi-

neering. The utilization of both natural and artificial light has received exhaustive study in the past five or six years and definite standards have been determined for the lighting of each operation in all classes of industrial plants. In nearly every large city are located consulting engineers who make a specialty of illuminating engineering practice, and most of the large manufacturers of lighting equipment maintain corps of engineers whose services are available to prospective customers.

## Early Panama Exposition Exhibitors

BY ALFRED G. ANDERSEN

Now that the great exhibit palaces at the Panama-Pacific International Exposition are completed, activity is mainly centered about the interior of the buildings. The exhibitors are erecting their large and ornamental booths, and exhibits are pouring in by the trainloads. Many of them will be ready to be viewed by visitors two months or more before the Exposition opens.

The largest single exhibitor among the early arrivals, and perhaps the largest single private exhibitor at the whole Exposition, is the United States Steel Corporation, which has secured an exhibit space of 42,000 sq. ft. in the Palace of Mines, and voted an appropriation of \$150,000 for participation in the Exposition. The Corporation's exhibit will include large models of iron-ore mines, of docks and blast furnaces, and of means of transportation. There will also be an extensive display of iron and steel products, telling their complete history from the ore to the manufactured article. The progress of steel and iron will also be shown in a motion picture film, no less than 20,000 ft. in length. There will also be a demonstration of how the corporation deals with the social and economic aspects of its labor forces; the social economy department will occupy 3000 sq. ft. of the corporation's total exhibit area.

The Busch-Sulzer Bros. Diesel Engine Company, St. Louis, whose exhibit was the first to reach the Exposition, has begun to unpack its cases in the Palace of Machinery. The cases were in the building long before the plasterers and electricians had evacuated the premises, and so the big boxes had to be stored up in a corner until the artisans were through with their interior work on the structure. This exhibit will comprise several of the latest improved types of Diesel engines in motion.

There is at present what may be termed a pre-Exposition exhibition in the Palace of Machinery, consisting of exhibits by firms who have contracted for various installations at the Exposition.

Parrott & Co., San Francisco, representing 11 Eastern manufacturing concerns, are installing a live exhibit, covering 6000 sq. ft. in the Palace of Machinery. The equipment to be shown there will be operated under the management of S. T. Wallace. The manufacturers represented are: The T. L. Smith Company, Milwaukee, Wis.; C. H. & E. Mfg. Company, Milwaukee, Wis.; Clyde Iron Works, Duluth, Minn.; Russell Grader Mfg. Company, Minneapolis, Minn.; American Safety Device Company, New York; Ceresit Water-proofing Company, Chicago; St. Louis Steel Foundry Company, St. Louis; Barber Asphalt Paving Company, Philadelphia; Concrete Appliance Company, Los Angeles, Cal.; Haslett Spiral Chute Company, San Francisco, Cal.

The Federal Trade Commission law and related acts have been incorporated into a 42-page pamphlet published by W. H. Lowdermilk & Co., 1424 F street, Washington, D. C. There is an introduction by John B. Daish, of the District of Columbia bar, which gives an analysis of salient features, but there is also a digest of the act as well as the verbatim reprint of it. Besides this the Federal anti-trust act of July 2, 1890, and the various anti-trust amendments to the Wilson tariff act are included. While the book is published at 50 cents, the American Exchange National Bank, 128 Broadway, New York, has arranged for a free distribution to those interested.



## ECONOMIES BY CO-OPERATION\*

### How Competitors Could by Associated Effort Reduce Manufacturing and Stock Costs

Of the many houses grouped under any one business heading, a large percentage must, in the natural course of events, have an accumulation of data, patterns, tools or other equipment, common to all, but accumulated individually, at a very considerable individual expense and actually in use during an uneconomic portion of the time. I am not speaking now of the data, patterns, tools and equipment essential to the individuality of the houses using them, but to the great mass of general data, patterns, tools and equipment used by all manufacturers in a given line of work and having no specific individuality of their own. Much of this economic waste is recognized. As a result, addressing lists for circularizing and certain basic stock are available to whoever may wish to buy. But even these ordinary general facilities do not seem to be employed as universally as might be expected; possibly on account of a lack of knowledge of their availability, but apparently for the reason that individuals fear that the knowledge that they are not doing all of their work under their own roof might weaken their position in the eyes of their customers. Or they feel that they have so much keener insight and judgment than the majority of their fellows that they have evolved a completely new advantageous method of procedure, when as a matter of fact the same general method or a better one is employed by thousands of others.

Bear in mind that I am not decrying individual thought or action, for initially that is the secret of the success of the American people. That success could only have come about in abundance through the later joining together of individual effort on an economic scale with respect to production, and that has resulted in the large corporations. For those who are not included under the heading of large corporations, there is still open, to a considerable extent, the same procedure which is possible in the large corporation if they will but become better acquainted with their neighbors and relax somewhat in that feeling of secrecy and jealousy regarding knowledge of their own movements, which is a mark not of the present day, but of the day of small trade and the secret process.

#### MODERN SPIRIT OF DISSEMINATING KNOWLEDGE

In older days the skilled workman in a shop would hold his preferred position through his knowledge concerning some part of the process or work and the jealousy with which he guarded that knowledge. To-day the scientific societies, engineering societies and schools distribute information freely at the earliest possible opportunity, and this distribution is ably seconded by the trade press. The real theory back of this greater freedom in the dissemination of new knowledge is a certain pride and confidence which permits the individual to give freely of his knowledge. He can afford to give freely of his knowledge, due to the fact that through the training acquired in obtaining it he has placed himself in a superior position and that by the time those to whom he is freely giving have advanced to his present position he will have advanced so much further that his position is still assured.

Every manufacturer or business house has a

friendly clientele which would prefer to buy as much as possible of the goods of a certain line from the single house, as the routine is thus simplified and the relations between the two are strengthened. Sooner or later a good customer inquires for an article which the house is not in a position to supply. He is put to inconvenience by being obliged to hunt up the article unobtainable through the customary channel. The manufacturer may decide that rather than have his customer go to others, he will manufacture the article specially, although he realizes that he can expect to do so only at a loss and is taking the action entirely as a matter of policy and not as an economical procedure from the manufacturing standpoint. From the economic standpoint how much better it would have been had the manufacturer felt free to go to the competing manufacturer, explain the situation, purchase the material called for at a trade price and sell it to his customer at a fair consumer's price, at the same time making clear his willingness to reciprocate.

From the same economic standpoint, how much better it would have been for dealers or contractors, instead of individually attempting to manufacture in a small way with attendant duplication and in many cases mediocre results, coupled with inevitable distraction of their attention from the feature of the business with which they were familiar and from which their main income was derived, had they continued to purchase their material and devote their progressive energy to prodding the manufacturer to supply them with standard material at lower cost and to place at their disposal other material which would enable them to expand into a more ambitious field.

#### COMPETITORS TO MAKE PRODUCTS COMMON TO ALL

Should manufacturers, dealers or contractors so desire, and the circumstances warrant, they could get together and contribute to the formation of an entirely separate company which would manufacture material used in common by all, or a large percentage of them and through their pro-rata ownership of the stock of the company, they could control the decision as to just what parts would be manufactured on the co-operative basis and arrange for the most economic method of manufacture and provide for the obtaining of the lowest cost either through the price charged by the separate company or in return of dividends. If this were attempted on a large scale it might conceivably develop objectionable features, but if such an organization were open to all who wished to enter and was conducted along sound commercial lines, it might be entirely feasible.

Some such organization might also handle certain advertising, common to the interests of that entire branch of industry. Some co-operative advertising is now done and an example of this which comes to my mind is that of a half dozen manufacturers of cast-iron pipe. Possibly manufacturers might do this with particular advantage at the present time with respect to advertising for foreign trade, including in the printed matter, name and address of each of the contributing manufacturers, to insure against any suggestion of partiality in the distribution of results.

Co-operation need not and should not submerge individuality, but should render that individuality more efficient. Acquaintance is an asset and acquaintance is stimulated by co-operation, and if this co-operation exists among competitors an acquaintance results among the very men who should be acquainted in order the more rapidly to increase the assets of all.

\*From an address made before the Efficiency Society, Lake Placid, N. Y., September 19, by W. N. Dickinson, General Elevator Company, New York City.



# The Southern Iron and Steel Industry\*

## Beginnings of Concentration of Interests—Introduction of Steel Making—Low Pig-Iron Prices

—BY JAMES BOWRON†—

The business of the South, as some of these old rolling mills went out of existence, concentrated more and more upon the production of foundry and forge pig iron in the Birmingham and Chattanooga districts, in which competition Birmingham had the advantage owing to the greater area and mass of its red ore supply and the greater, and indeed unrivaled, propinquity of its ore, flux and fuel. For a time it was assumed that Southern pig iron was worth at least \$1 per ton less than Northern iron, because of its content of phosphorus. In 1879 the writer was assured by the leading stove manufacturer of St. Louis that he could not dream of putting such an inferior material into his cupola, but would only use Hanging Rock and Glengarnock.

A factor arose, however, very helpful to the South, namely, realization by the trade about 1889 of the effect of silicon in softening castings. It was found that by using from 30 to 32 cwt. of coke with 12 per cent. ash it was easy to make high silicon pig. The writer has seen what the English call "glazed" pig iron put back into the furnace to be remelted, as unmerchantable, but it was not very long before the Southern high silicon or "bright" iron, as we called it, worked its way into favor as a softener and scrap carrier, and the virtue of pig iron, high alike in phosphorus and silicon, gave it preference for the production of stoves, radiators and architectural castings.

### SOME CONSOLIDATIONS

Under the pressure of competition by the larger companies, questions naturally arose of decreasing competition by combinations, thus increasing resources and decreasing the expense of supervision and of distribution. In 1879 negotiations for the purchase of the Tennessee Coal, Iron & Railroad Company by the Southern States Coal, Iron & Land Company were arrested by the lamented death in his rolling mill of Thomas Whitwell. He was chairman of the English company. This being followed up by the death of two leading stockholders, led to the reversal of the negotiations, and in 1882 the Tennessee Company absorbed the Southern States Company. In 1886 the company extended its operations in Alabama and acquired the Pratt Coal & Iron Company, which had itself previously absorbed the Pratt Coal & Coke Company, the Alice Furnace Company and the Linn Iron Works. In 1887 the company enlarged its operations by building the blast furnaces at Ensley, the most ambitious construction in the South up to that time and embracing four furnaces 80 ft. x 20 ft., equipped with 12 Weimer blowing engines 84 in., 36 in., 54 in., and 16 Whitwell stoves 65 ft. x 20 ft. In 1892 this company, enlarged further by the purchase of the DeBardeleben Coal & Iron Company, itself a combination embracing the Bessemer Iron & Steel Company and the Little Belle Iron Company. Later in the same year it absorbed the Cahaba Coal Mining Company, which had itself previously acquired the

Excelsior Mining Company, Blocton, Ala. In 1899 the company bought a blast furnace plant at Sheffield, Ala., embracing three stacks, which purchase was subsequently relinquished.

In 1899 the Republic Iron & Steel Company, which had assumed a commanding position in the North by the purchase and consolidation under one ownership of many rolling mills, extended its operations to the South by purchase of the mineral lands and blast furnaces of the Pioneer Mining & Mfg. Company, the Birmingham Rolling Mill, and the Alabama Rolling Mill. The president of the last named, W. H. Hassinger, became district manager of the entire properties, and was ably backed by F. B. Keiser, with his Pennsylvania experience.

In 1887 new interests bringing New York and Richmond capital came into the Sloss Furnace Company, enlarged its capital and ownership of mineral lands and built two additional furnaces in North Birmingham, presided over from 1888 to 1896 by Thomas Seddon. In 1899 the operations of this company were enlarged by the acquisition of the large area of brown ore lands previously owned by the Lady Ensley Iron Company, located in the Russellville district, and the three blast furnaces at Sheffield and Florence, to which these brown ores were tributary, the name of the company being then changed to Sloss-Sheffield Steel & Iron Company.

### DEVELOPMENT OF FOUNDRY IRON

As a result of these various consolidations, competition for the foundry trade became intensified and the prevailing low prices and excellent foundry qualities of Southern pig iron led to a large development in the South of the cast-iron pipe trade. The foundries at Chattanooga, Bridgeport, South Pittsburg, Anniston and Bessemer were then established, followed in subsequent years by those at Sheffield and North Birmingham. Until this trade became overbuilt, and riveted steel pipe became an opposing factor where heavy freight rates were involved, it was a profitable industry, the pig iron being the principal factor in the cost of the pipe, and this being sold at extremely low prices, with mere switching rates from the furnaces to the pipe foundries.

In 1888, prior to the establishment of these foundries, the writer analyzed the shipments of the largest producer and found that the product was shipped over 30 different States, and that the entire consumption in the South amounted to only 13½ per cent. The influence of the pipe foundry movement is rendered apparent by a similar abstract made in 1894-5, showing that while the product was then distributed over 39 different States and 5 foreign countries, the Southern consumption had risen to nearly 22 per cent., Alabama alone being advanced from seventh in order to second.

This movement was of supreme importance, for the Southern consumption of forge iron had been steadily dying out. The earnest efforts of General Powell and Mr. Schofield at Chattanooga, with Major Peters, of Brierfield, had proved in vain. The relentless march of steel was pushing manu-

\*Second installment of paper presented before the American Iron and Steel Institute, Birmingham, Ala., October 30, 1914.

†President Gulf States Steel Company, Birmingham, Ala.

factured iron into the background, both as to plates and bars, and wire nails were making inroads upon cut nails. The works at Helena had also fallen by the way, although the Knoxville mill succeeded, and continues to this day.

#### EFFECTS OF DEPRESSION BEGINNING IN 1893

At this time the Southern situation became greatly aggravated by the national political changes resulting in the transfer of power to the Democratic party, March, 1893, followed by the Wilson-Gorman tariff bill of 1894, which forced reductions of prices upon the industry, owing to the lower duties. To meet these lower prices, reductions of wages were sought, and the Birmingham district was confronted with a four-months' paralyzing strike of coal miners fighting against the reduction from 45 cents to 35 cents as the base price for digging the Pratt seam coal. After serious disturbances, involving the use of the militia, this was compromised on a 37½-cent basis. At the same time the country at large was most seriously affected by the Debs railroad strike, requiring the use of Federal troops from Chicago to restore order, and the disturbance reached down even to Alabama. There seemed little to encourage iron manufacturers in those days to continue in business. The strikes were no sooner over than another era of depression followed the threat of war with England over the Venezuelan question, and this in turn was succeeded by a recrudescence of the free silver question during the Presidential campaign of 1896. Hardly was this settled by the election of McKinley and the adoption of a changed tariff policy, than the situation was again clouded by the Cuban situation, projecting the shadow of the coming Spanish-American war, and it was not until the close of that war in 1898 that the position clarified.

During this period of financial stringency, increasing the output of pig iron and decreasing the consumption as mills were pushed out of activity, there is little doubt that some producers would have stopped if they could have paid their bills. Heavy tonnages of iron were carried in warrant yards on borrowed money. Pig-iron brokers made more money than the producers, either out of their sales commissions or by interest on the money which they advanced to the shippers against their bills of lading, sometimes every week and sometimes every day. Abnormal prices were made, which only covered in some places the cash out of pocket cost. The writer can remember one sale of 5000 tons of No. 2 foundry at \$6.25 spot cash, immediate delivery in one block, to meet a payroll; another commercial transaction, a cargo of No. 4 foundry for Japan at \$5.75, the balance of the sailing ship being filled up with coke. Needless to say such prices provided nothing for the depreciation of the plants which were standing still, or for the replacement of minerals which were being taken from the richest and most accessible points. Only the intrinsic value of the great mineral deposits of the South, and the faith of the various officials carried the district through those trying years.

#### BEGINNINGS OF EXPORT BUSINESS

Under these conditions, the familiarity of some engaged in the business with European conditions led to initiation of a foreign trade, shipping pig iron at ballasting rates of freight, in conjunction with cotton, largely to Hamburg, Bremen and Rotterdam for transshipment by barges to internal points in Germany and even Switzerland, and to Genoa, Venice and Trieste for northern Italy and part of Austria. Shipments of smaller character

went to almost every country importing cotton, the dead weight of the iron harmonizing with the lightness and bulk of the cotton. This trade became most important in bridging over the critical period, the shipments exceeding 100,000 tons per annum. But this was not enough relief. Claims for short weight after transfer to lighters were inevitable. Cars were occasionally left by impatient shipmasters, disputes and delays in settlement ensued, and the business at best was only one of marking time.

#### BEGINNINGS OF STEEL MAKING

It was inevitable under these conditions that the minds of producers of pig iron should turn with anxiety to the question of the production of steel. During the late seventies and early eighties experiments had been carried on in Chattanooga by Mr. Leighton, making small amounts of open-hearth steel in an experimental way. These were little more than enlarged laboratory experiments, and ceased with his working capital. The Roane Iron Company, always successful as the owner of the Rockwood furnaces, undertook the manufacture of Bessemer rails at Chattanooga, making the iron from a mixture of Cranberry ore and another found near Morristown, Tenn. The latter was irregular in phosphorus and the deposit limited. As the rails produced were too high in phosphorus, the experiment was discontinued and the mill was ultimately sold and broken up. The experiment was deeply interesting and conducted with vigor and intelligence.

Before the plant was broken up, however, it afforded opportunity for an adequate demonstration in the way of Southern steel making under the auspices of the Southern Iron Company. In 1890, under the control of N. Baxter, Jr., and A. M. Shook, of Nashville, for so many years the leading officials of the Tennessee Coal, Iron & Railroad Company, the Southern Iron Company undertook the experiment on a commercial scale of the manufacture of open-hearth steel in the South from Southern pig iron. In a small way this had been done in Birmingham in 1888 by the Henderson Steel Company with the large use of fluorspar as flux. About 1800 tons of steel had been made there, operating in a small way and necessarily at a high cost. For the experiment at Chattanooga by the Southern Iron Company about 800 tons of South Pittsburg iron was manufactured under 1 per cent. silicon and 0.6 per cent. sulphur, the phosphorus approximating 1.40 per cent.

The steel thus made was available for trial on the occasion of the joint visit of the American Institute of Mining Engineers, the British Iron and Steel Institute, and Verein deutscher Eisenhüttenleute in 1890, at which time, in the presence of Charles Kirchhoff, editor of *The Iron Age*, a variety of tests of the physical qualities of the steel were made in a most severe and searching manner. It had always been contended that our Southern iron contained too much phosphorus for either the Bessemer or the acid open-hearth process, and not enough for basic Bessemer, and that it contained too much silicon to be used successfully in the basic open-hearth furnaces. Mr. Barton is quoted as saying that experiments were made with the concurrence of Mr. Talbot and reduced the silicon in the Ensley pig iron by pouring it through a bath of blast furnace slag, but that while this reduced the silicon it absorbed a fatal amount of sulphur from the slag. The writer was deeply interested in Mr. Talbot's process, which was invented and developed at Chattanooga, and became an insistent advocate of a move toward the production of steel by the Ten-



nessee Coal, Iron & Railroad Company, in whose service he was then employed.

In April, 1881, S. G. Thomas, one of the joint inventors of the basic process, had been the guest of the writer at his home in South Pittsburg, Tenn., and a negotiation was then started for the English company acquiring the sole right to manufacture steel under that process in the South. This negotiation lapsed owing to the lamented death at an early age of the distinguished inventor. At a later date the Tennessee Coal, Iron & Railroad Company became the owner of Jacob Reese's patent for the duplex process, but the information obtained seemed to indicate so great a loss by oxidation and slagging in the double process as to make it undesirable.

No one in the South had the money to go into such a plant. It was necessary to enlist Eastern capital. At a dinner in Birmingham Andrew Carnegie had said to President Baxter that the Tennessee Coal, Iron & Railroad Company owed it to the district to make steel here, but the Tennessee Company had all it could do in those trying days to keep hot the irons which were in the fire without burning any of them. Matters, therefore, rocked along until after the development of large beds of dolomitic limestone in East Birmingham. G. B. McCormack said to his colleagues in the Tennessee Coal, Iron & Railroad Company that he felt sure a liquid slag could be carried on a burden heavy enough to hold the silicon below 1 per cent. After making a few tests at the Alice furnace, casting in sand, commencing July 22, 1895, the furnace was equipped with chills, and regular commercial practice commenced August 15. In a very short time the entire make of the furnace was being sold to the Carnegie Steel Company, Illinois Steel Company, and other well-known companies in the North, under a guarantee that the silicon and phosphorus should run below 1 per cent.

This continued for over two years, by which time the most skeptical were satisfied that suitable iron could be made locally for conversion into steel. The next question arose as to the size and scale of the plant necessary to handle such iron commercially. In 1896 a subscription had been raised among the citizens, Birmingham contributing approximately \$75,000 toward the construction of an open-hearth furnace at the Birmingham Rolling Mill. On July 24, 1897, the first casting was made at that plant—bottom-poured ingots weighing about 1400 lb. each. The experiment was too small to be a commercial success, and the company failed in 1899.

#### LARGE SCALE STEEL PRODUCTION BEGUN

In December, 1897, President M. H. Smith, of the Louisville & Nashville Railroad Company, came to Birmingham and told the officers of the Tennessee Coal, Iron & Railroad Company that his company had invested many millions in and around Birmingham, that the iron manufacturing plants were wearing themselves out, exhausting their most accessible materials, and making no money, and that unless steel was manufactured on a large scale the district would be a failure. He said that the Louisville & Nashville had too much invested to sit still and watch that failure; that the Tennessee Coal, Iron & Railroad Company owed it to itself and to the district to go into the manufacture, and that if it refused to do so the Louisville & Nashville would contribute toward the enlargement of the plant at the Birmingham Rolling Mill. An earnest effort was made by President Baxter and Vice-President Shook to obtain the concurrence of the directors in New York in such a departure, but the menace of the then impending Spanish-American war was such

that they refused to consider it. They passed a resolution authorizing the officers to subscribe \$100,000 toward the enlargement of the Birmingham Rolling Mill plant, payable in coal and iron over a year, and to contract to stay out of the steel business for a period of years.

The writer of this article challenged the wisdom of this action by letter, which, with the answer thereto, appears in the history by Miss Armes, pp. 463-4. As a result of this earnest remonstrance the necessary authority was obtained, and after six months' active co-operative effort on the part of the various officials of the Tennessee Coal, Iron & Railroad Company, \$950,000 was raised in New York and \$150,000 in Birmingham, and an open-hearth plant was located at Ensley on the plans of the Wellman-Seaver Engineering Company, of Cleveland, who had been designated by President Smith, of the Louisville & Nashville Railroad Company, for that purpose. This plant was built under the name and charter of the Alabama Steel & Shipbuilding Company, the common stock being owned exclusively by the Tennessee Coal, Iron & Railroad Company. It comprised 10 tilting open-hearth furnaces, theoretically averaging 50 tons per heat and two heats per day, with a 42-in. blooming mill.

The average production in the first year of operation did not exceed 300 tons per day. The pig and scrap process was employed, but the possible production of the furnaces was held down by the unsatisfactory working of the ingot-heating arrangements, the designers having equipped the plant with a tunnel through which the ingots passed on their stools, instead of the customary soaking pits. It was found in practice that the heating was irregular, some of the ingots coming out too cold for rolling, while others melted down on the stools. The company was not equipped to manufacture anything but billets 4 x 4 in. square and upward, and it was soon apparent that the problem of finding a market had changed its character but still existed.

Some billets were sold in England, but the principal delivery was to the Alabama Steel & Wire Company, which built a plant abutting upon the Ensley steel works. This was constructed by Chicago and Joliet capital, under the management of E. T. and G. H. Schuler, of Chicago, and C. E. Robinson, of Joliet. Accustomed to Bessemer steel the results obtained from the open-hearth product were not satisfactory, and in 1903 this company built a plant at Gadsden to supply its own steel, the plant embracing a blast furnace, four 50-ton stationary open-hearth furnaces, and a 36-in. blooming mill. This removed from the Tennessee Coal, Iron & Railroad Company the largest consumer of its billets, and forced the completion of finishing mills into which the product might be turned.

(To Be Continued)

#### A New Disk Type of Valve for Air Hoists

The Whiting Foundry Equipment Company, Harvey, Ill., has recently developed a disk valve for use in connection with air hoists. No packing is used in the valve, which is designed so that the stem does not pass through the air chamber, an arrangement which is relied upon to eliminate leakage at this point. The working parts of the valve consist of a brass disk operating on a cast-iron body and held in place by air pressure and also by a coil spring. The valve seat and the disk are both ground, an arrangement which is relied upon to give an air-tight joint. The lever controlling the valve has a movement of 45 deg. on either side of the central position, and the stem does not pass through the air chamber. If it is desired to remove the cover and disk at any time this can be readily done without disconnecting the piping.



## TURBINES IN STEEL PLANTS

### And the Position of the Compound Condensing Reversing Engine\*

At the Youngstown Sheet & Tube Company's plant we have in the last eight years installed some 34 turbines under various conditions and service. Among our installations we have one turbo blower operating on a blast furnace and one operating on Bessemer converters, as well as one mixed pressure turbine taking steam through regenerators from a 54 x 66 in. simple reversing engine.

In view of the increased saving in first cost and fixed charges, as well as the saving in repairs, the turbine at present appears to be a cheaper method for handling air than a reciprocating engine even on vacuums as low as 26 in. Below this point, the question becomes a rather doubtful one.

#### EFFECT OF WORKING OF FURNACE

We feel that it is at present a question whether a steady blast is in reality an advantage. The stock in a blast furnace must settle, yet it is an open question whether the innumerable small impacts of the blowing engine does not cause a more uniform settlement than the less frequent and larger settlements caused in the operation of the turbo blower. The effect on furnaces using the finer Mesaba stock may mean an increase in flue dust from a furnace blown by a turbo blower amounting to enough to prohibit their use with these ores. We have found that the blower produces an excess of flue dust over that produced by the engine when the furnace is working on the same burden and at the same rate of driving.

We have found a reduction in yield of as much as 5 per cent. which we have been able to attribute only to the different method of producing the blast. This condition may, after all, be the determining factor in the selection of a blowing unit. The absence of vibration of the air lines is a marked characteristic of the turbo blower which will tend to a reduction in cost of maintenance of equipment.

#### TURBO BLOWER ON BESSEMER CONVERTERS

While there may be a question as to the advantage of a steady blast in blast furnace operation, there appears to be no question as to its advantage on a Bessemer converter. A further advantage of the turbine for this service is its ability to maintain a uniform pressure under widely different conditions of delivery.

It is necessary for the operator to manipulate the throttle valve of the engine to maintain the delivery pressure while in the case of the turbo blower the governor is entirely automatic, being controlled by the blast acting on the throttle valve. We are inclined to believe that due to this better regulation a reduction in the time of blowing heats and a consequent increase in tonnage can be obtained.

The steam consumption in this plant has been found to be governed by the same conditions as those mentioned for the blast furnace blower, i. e., the vacuum becomes the determining factor. On the converter the service of the blower is much more severe than on the blast furnace and a considerably more rugged machine should be specified for this service.

### SIMPLE ENGINE WITH MIXED-PRESSURE TURBINE COMPARED WITH COMPOUND CONDENSING ENGINE

In the past four years we have been operating a mixed-pressure turbine utilizing exhaust steam from our No. 1 blooming mill engine through regenerators. About a year ago our No. 2 blooming mill, driven by a twin-tandem compound condensing reversing engine was put in operation on practically the same service as our No. 1 mill. Both mills have a maximum capacity of 63,000 tons per month. In multiple with regenerators on No. 1 mill, we have installed a large accumulator feed water heater, the arrangement of piping being such that the heater is given preference as to the use of the exhaust steam, this being admittedly the most economical means for the utilization of the heat. The water control to this heater is such that the water is admitted during the time when steam is available. The water thus heated is then stored in a large accumulating space.

We have made quite extensive tests on the two mills and find that the steam consumption of the condensing engine is practically one-half that of the non-condensing engine.

It has been claimed by some engineers that it is impossible to maintain a high degree of vacuum in the low-pressure cylinder of a reversing engine. We have, however, disproved this fact. The vacuum in the low-pressure cylinder is 22 in. and at no time are we troubled by a reduction in vacuum when making reversals.

If a mixed-pressure turbine can be installed, producing power equal to that of the reversing engine, the scheme becomes a good one. Our experience, however, has been that it would require steam regenerators of enormous capacity to handle the steam fluctuations properly; also that the regenerators must be of very heavy construction to withstand the impacts of the large quantities of exhaust steam intermittently admitted. High-pressure steam, we find, must be used frequently when low-pressure steam is not available. It therefore becomes exceedingly important to install a mixed-pressure turbine having an exceptionally good high-pressure steam economy, as well as low pressure, in order to make the installation a paying proposition.

We feel that probably the only justification for the installation of regenerators and a mixed-pressure turbine is in a case such as ours, where the mill cannot be spared for a sufficient length of time to replace the existing engine with a compound condensing engine.

The average steam cost for our No. 1 mill is \$10,000 per month. In this is included the high-pressure steam for operating the mixed-pressure turbine when running on high pressure. It is figured that the value of exhaust steam, used for heating feed water, approximates \$3000. The value of the electricity generated by the mixed-pressure turbines is \$2500 per month, leaving a net steam cost per month to the mill of \$4500.

The total average steam cost of our No. 2 blooming mill is \$3000 a month, which shows a saving of \$1500 a month in favor of the compound condensing engine.

From a comparison on our No. 1 and No. 2 mill engines, we believe that the proper installation is a condensing reversing engine, the feed water heat being obtained from boilers, fan and stoker engines and all other auxiliary machinery.

In case this is not feasible, the next best scheme is the combining of regenerators and feed water heater in connection with the mixed-pressure turbine with the best possible high-pressure steam economy.

\*From a discussion by Lief Lee, chief engineer, and Karl Naecker, steam engineer, of the Youngstown Sheet & Tube Company, Youngstown, Ohio, of a paper presented by F. G. Cutler, before the American Iron and Steel Institute, and reviewed in *The Iron Age* of October 29.

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# THE IRON AGE

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## The World's Leadership

In an article in *The Iron Age* of February 25, 1892, the bold claim was made that leadership in the world's iron trade had then been established by the United States. Its production of pig iron had attained an annual output of over 9,000,000 tons and of all kinds of steel of nearly 5,000,000 tons. Great Britain was then producing about 8,000,000 tons of pig iron and less than 4,000,000 tons of steel. Germany, the third largest country in point of production, was making less than 5,000,000 tons of pig iron and less than 2,500,000 tons of steel. The statement in *The Iron Age* recorded "the triumphant advance of the United States to first place among the iron and steel producing nations of the world—a position secured by such a strong lead that no competition for the honor will hereafter be recognized." These were strong words, but they are apparently more warranted now than they were at that time. In the intervening years we have seen a great change in the relative position of Great Britain and Germany. The order in which these countries stood in 1892 has been reversed, Germany having gone far beyond Great Britain in the production of both pig iron and steel. The lead of the United States over its nearest rival, in this case Germany, is, however, being well maintained. In 1913 the output of pig iron by the United States was 30,966,301 tons and its output of all kinds of steel was 31,300,874 tons. The output of Germany in the same year was 19,309,000 tons of pig iron and 18,935,000 tons of all kinds of steel.

While it would seem from the figures given above that even under ordinary conditions of world-wide peace the United States is so safely in the lead that no indication is perceptible of its being supplanted by any other country, the conditions brought about by the European war give rise to some speculation regarding the position Germany is likely to occupy with respect to other producing nations in the immediate future. Figures just published show that the production of pig iron in Germany has been more than cut in two by the disorganization of trade precipitated by the war. This condition is likely to last as long as the war continues, and after peace shall have been declared it will undoubtedly take a considerable period for German iron and steel manufacturers to regain their former standpoint of efficiency in operations. Something will also depend upon the ability of Germany to regain its footing in outside markets. Even if the other countries of the world recoup their

finances and become good buyers, it is quite possible that Germany may find it a work of some years to recover her old standing in the world's markets.

Another factor in this situation is presented by H. H. Campbell in the current issue of the *Engineering Magazine*, in an article entitled "Why Germany Needs Alsace-Lorraine." Mr. Campbell, who is an eminent metallurgical engineer, and is the author of a book on "The Manufacture and Properties of Iron and Steel," gives an interesting history of these provinces from the Roman period, and in the course of his article points out the fact that since their German occupation in 1870 the basic process has been developed, through which the huge deposits of minette ores in Lorraine, which had little value 44 years ago, have now become a highly important source of supply for the basic Bessemer works of western Germany. Mr. Campbell states that "great injustice would arise from any change in the location of the frontier between France and Germany if that would happen as a result of the present war." He further says: "If France had Lorraine she might put a heavy export duty on iron ore and cripple the whole German iron industry of the Lower Rhine. She could increase the cost of steel in Westphalia so much that Germany would have difficulty in competing for oversea trade." This might possibly be one of the momentous results of the present European conflict, whose outcome it is now impossible to predict.

## War Exports

A glance over the detailed showing of merchandise exports from the United States in September, just issued, shows that some lines already stood out prominently in that month, either through a special demand for war purposes or through the war curtailing the usual supplies.

In order to avoid the influence of seasonal fluctuations it is desirable to compare exports in September last with those of the preceding September. It should be noted that the total exports of all merchandise decreased from \$218,240,001 to \$156,337,333, or 28 per cent., so that when any increase is shown in a particular item the case stands out prominently. The total value of all iron and steel exports, including machinery, etc., but not electrical or agricultural machinery, decreased from \$22,831,437 to \$12,531,102, or 45 per cent.

Lead and spelter are not commonly exported from the United States, the production abroad be-

ing ample, but England has normally drawn large quantities of these metals from the Continent and such supplies are now almost entirely shut off. Although England's consumption naturally has been reduced, considerable amounts have been drawn from the United States. No lead was exported in September, 1913, but last September our exports were 2500 gross tons. Spelter exports increased from 50 tons to 17,000 tons. On the other hand, copper, in which we normally have a very large export trade, decreased from 33,000 tons to 20,000 tons.

An increase in the exportation of electric locomotives was probably despite the war rather than on account of it. The gain from one September to the next was from two to seven in number and from \$2072 to \$70,075 in value, but as the exports for the nine-month periods increased from 36 to 59 in number and from \$244,130 to \$575,088, the increase may be taken as a normal growth.

In gasoline automobile engines, on the other hand, there was clearly a war demand, even as early as September, while it is well known that the orders now being filled are very large. September showed increases from 52 to 70 in number and from \$9836 to \$16,211 in value, whereas for the nine-month periods the decreases were from 7809 to 2742 in number and from \$1,239,317 to \$955,982 in value, indicating that the movement had a great decrease this year, but has lately been revived by the war.

Horse shoes have shown a spectacular increase, from 100 tons in September, 1913, to 1300 tons in September, 1914.

Barb wire presents an interesting case. It is well known that there has been a large demand from the belligerent countries, to which normally we do not send a great deal of barb wire, while our trade with neutral countries is very greatly decreased. The result is that while we exported 7100 tons in September of last year we exported only 5000 tons in September of this year.

### The Alignment of Scrap Prices

In our issue of October 1 reference was made to the low prices ruling for melting steel scrap as compared with pig iron. Heavy melting steel delivered to Pittsburgh mills was then quoted \$2.90 a ton below the price of basic pig iron, while until 1913 the divergence had always averaged less than a dollar a ton, except when pig iron advanced to very high levels, in which instances scrap had been unable to follow.

Since that comparison was made pig iron has declined slightly, but scrap still more, so that the difference at Pittsburgh is now about \$3.30. The largeness of this spread is being commented upon as being very remarkable, on the theory that as it ought to induce very heavy buying of steel scrap and correspondingly less consumption of pig iron, the scrap market should have more strength than it shows.

An explanation for the phenomenon can be suggested. Steel mills cannot replace pig iron with melting steel indefinitely. A certain proportion of steel scrap is desirable, as shortening the time required for finishing a heat, and if the material can

be bought cheap, so much the better. Beyond a certain limit, however, the proportion cannot be carried, because there must be a certain amount of carbon in the charge. When the steel melter has taken all the steel scrap that can be carried, he must turn to something else. Just now he is turning largely to cast borings, heavy cast scrap and car wheels. This trend is plainly shown in market prices. Our last three market reports from Pittsburgh have quoted heavy breakable cast scrap in that district at 25 cents above heavy melting steel scrap, showing a relation that has never obtained before when prices were low. It is normal for cast scrap to sell below steel scrap, by an average of, say, 50 cents to \$1.50 a ton. The exception hitherto has been only when prices were high all around.

When pig iron undergoes a heavy advance steel melting scrap does not advance nearly as much, because the consumers are largely producers of pig iron and make a profit on the latter, so that they do not buy steel scrap so heavily, even though in the open market it is much cheaper than pig iron. At such times a different alignment occurs with cast scrap, because the iron foundries buy all their pig iron, and also buy cast scrap, both heavy cast and No. 1 or broken. When pig iron advances largely they can afford to pay corresponding advances on cast scrap, while the steel mill will not pay corresponding advances on melting steel. Accordingly cast scrap in times of high prices advances above melting steel. In 1907 No. 1 cast scrap averaged \$2.25 above melting steel scrap in the Pittsburgh district, and heavy cast \$1.50 to \$1.75 above melting steel. Normally, as indicated, the cast scrap should be lower, and the fact that in the past two weeks heavy breakable scrap has been quoted 25 cents above melting steel is quite unusual, but is clearly explained by the conditions that obtain at this time in the steel mills using the pig and scrap process.

### Reducing Waste in Hiring Men

Continuing the discussion of M. W. Alexander's address before the National Machine Tool Builders, recently referred to editorially, the results of an investigation made by a large employer of mechanics in New England are of interest in pointing out certain remedies for the enormous financial wastes in the hiring and discharging of men. This costly condition was observed by the works manager who made a thorough investigation of the causes, covering a period of some weeks. Among other expedients was the employment of men to interview every employee who left as to the reason for his going. Those who were discharged do not count so much in the consideration of the subject, except in those occasional instances where dismissal was unjust and, of course, in the matter of improving the methods of the employment office, in the hope of procuring a more uniformly satisfactory class of workers. A foreman may err in judging the merits of a man's work, or he may have a grudge. Such cases are by no means unknown. In this investigation it was learned that one foreman had been "grafting" from his subordinates, taking money from them for the privilege of employment, and another foreman was discharged because he did not get along well with his men.



The matter of surroundings and associations is a vital one in the losses caused by men coming and going. The well lighted, well ventilated and clean shop will draw good men from plants that are not so agreeable, and it will have a better chance to retain their services. New works of the type seen so frequently nowadays have little trouble, other things being equal, in securing men from shops in which conditions are not so modern. The personality of fellow workmen has a bearing on the problem. One disagreeable, ill-kept individual may cause discomfort and discontent among those working with him.

Works operating on a 10-hour basis are at a disadvantage when located in a community having other plants employing the same class of help on a 9-hour schedule. And with this element may be grouped that of wages. The drift of workmen is naturally to positions in which they get the highest wage, unless the smaller income carries with it some compensating advantage. Also a man will seek the shop with shorter hours providing he can at the same time earn an equal wage.

All these factors were brought to light in the investigation by this New England works manager. Some causes were easily eliminated and the average number of men who left the plant decreased somewhat. But the fact that most of the machine shops of the city were operating 9 hours, while the one in question was running 10 hours, each as a full day's work, with the same general class of labor in each instance, was too serious a factor to be disregarded. Finally the board of directors decided to change to the shorter day. After that the number of men who left the employment was cut in half. Taking Mr. Alexander's figures of \$37 loss for each highly trained workman and \$60 loss for each mechanic of lesser skill, the consequent saving must have made up largely for any decrease in production due to the fewer hours of labor.

### Why Navy Yards Can Bid Low

The Navy Department announces with some exultation that when bids were opened November 10 for the construction of six torpedo boat destroyers it was discovered that the Navy Yard at Mare Island, Cal., had submitted an estimate of the cost of building these vessels at Mare Island that was in the neighborhood of \$200,000 less for each destroyer than the bids submitted by private shipbuilding firms that took part in the competition. Its estimate on one vessel was \$626,670 to \$674,917, according to type of machinery and boilers, and \$12,000 to \$17,000 less on two vessels. No reference is made as to the basis on which the Mare Island Navy Yard figured, but the presumption seems warranted that, unlike private bidders, the navy yard management was not obliged to consider such disagreeable items of cost as overhead charges on capital invested and allowances for depreciation of plant, to say nothing of an estimate of a reasonable profit to which a private shipbuilder is entitled if he expects to continue in business.

Two nickel steel bridges, said to be remarkable technical constructions, are to be erected over the marshy ground above the tunnel of the municipal North-South railroad in Berlin. Since steel in concrete easily corrodes in such ground nickel steel was decided upon.

### An Important Customs Controversy

WASHINGTON, D. C. November 16, 1914.—The important questions whether the rates of duty of the Underwood-Simmons tariff law shall, in effect, be reduced 5 per cent. and the Government be required to refund to importers an enormous sum of money are involved in a series of cases which were argued before the United States Court of Customs Appeals in this city November 11 and 12.

These cases arise under the terms of paragraph J, subsection 7, of the tariff law, which provides that "a discount of 5 per cent. on all duties imposed by this act shall be allowed on such goods, wares and merchandise as shall be imported in vessels admitted to registration under the laws of the United States: Provided, That nothing in this subsection shall be so construed as to abrogate or in any manner impair or affect the provisions of any treaty concluded between the United States and any foreign nation." In construing this section as applying to early importations under the Underwood-Simmons tariff act the collectors of customs, on instruction from the Treasury Department, refused to allow any discount whatever, on the ground that, if it should be granted upon goods imported in American vessels it must also be allowed on goods imported in vessels of countries with which we have treaties guaranteeing their commerce against discriminating duties. To allow the discount on practically all imports would be equivalent to a heavy cut in the national revenues and the Government, therefore, decided to take the position that the paragraph in question was nullified by the proviso that it should not be construed to abrogate any treaty.

On an appeal to the Board of General Appraisers the decision of the collectors was reversed, the board holding that on the plain letter of the law the discount should be allowed on all goods imported in American vessels. From this decision both sides appealed, the Government contending that no discount whatever should be allowed, while the importers insisted that allowance should be made not only as indicated by the board but also on goods imported in foreign vessels entitled by treaty to minimum rates of duty. The condition of the docket of the Court of Customs Appeals will permit the immediate consideration of this case and it is expected that a decision will be rendered therein immediately after the coming holiday recess, if not before. An appeal to the United States Supreme Court is inevitable and an understanding has already been reached that both sides will unite in asking that tribunal to advance the case for early argument. Protests already filed involve about \$25,000,000 refunds and the amount at stake may ultimately reach \$50,000,000.

In the event that the case is decided against the Government the Treasury Department will ask Congress to repeal paragraph J, subsection 7, action which would have been taken soon after the Underwood-Simmons law was enacted but for the fear that such repeal would constitute a strong argument in favor of the importers' contentions. The necessity for repealing the provision is further emphasized by the certainty that the American merchant marine will be materially increased in the coming year or two and the possibility that the Government may embark on the experiment of buying and operating merchant vessels under the terms of such a law as is contemplated in the Alexander shipping bill.

W. L. C.

The property of the Leetonia Steel Company, Leetonia, Ohio, which went into receivership about a year ago, shortly after construction work was started, was sold at public auction by William H. Hepburn, receiver, November 10, for \$32,500. The purchaser was a law firm—Billingsly, Van Fossan & Moore—of Lisbon, Ohio, where the sale took place. The property includes 30 acres of land, concrete foundations for buildings and personal holdings. The law firm that purchased the property, it is understood, acted as the agent for a number of interested capitalists. A report that the property was purchased for W. D. McKeefrey, Leetonia, Ohio, is denied by the representative of the McKeefrey interests.

## National Founders' Meeting

The National Founders' Association opened its eighteenth annual meeting at the Hotel Astor, Wednesday morning, November 18. The attendance while not so large as last year was regarded as particularly gratifying with the present condition of the foundry business. Most of the morning was given up to receiving the reports of President William H. Barr, Buffalo; Commissioner A. E. McClintock, Chicago, and Secretary J. M. Taylor, Chicago, and of Marshall Cushing, Washington correspondent, on "The Political and Social Significance of Recent Labor Legislation," and of Henry B. Sargent on the work of the joint committee of associated employers on the Federal industrial commission.

Mr. Barr contended that a change for the better has come in business and briefly outlined the better conditions which are gradually being provided for employees in the matter of safety, health, convenience and advantages in general. He mentioned as a proof that labor leaders and legislators had not properly represented public sentiment that the so-called full-crew act in Missouri, was repudiated by a referendum vote. He considered it a matter for national congratulation that business has withstood the adverse influence brought about by the European calamity. He expressed the hope that the railroads would get the increase in freight rates for which they have petitioned. He indicated to what extent foundries may expect South American business. He paid an eloquent tribute to O. P. Briggs for the evidence which he placed before the Commission on Industrial Relations and mentioned the promising work in this connection which is being done by a joint committee of the National Founders' Association, the National Metal Trades Association, the National Erectors' Association, the National Association of Manufacturers and the Council for Industrial Defense.

The banquet of the so-called alumni, composed of past and present members of the administrative council of the association, was held as usual on Tuesday evening. Matthew Griswold, Jr., General Electric Company, Erie, Pa., acted as toastmaster and notable among the speeches were those of Henry M. Leland, Cadillac Motor Car Company, Detroit, and Isaac W. Frank, United Engineering & Foundry Company, Pittsburgh. About 35 were present and the speeches generally had to do with the desirability for fuller co-operation on legislative matters among the various associations interested.

## Colorado Fuel & Iron Company's Report

Some figures were published in *The Iron Age* of November 5, page 1072, of the financial results of the operations of the Colorado Fuel & Iron Company in the fiscal year ended June 30, 1914. The figures were taken from press dispatches. Since then the full twenty-second annual report of the company has been received. This report deals largely with the great coal strike in Colorado which played havoc with the company's earnings. A history of the strike is given, for which President J. F. Welborn shows conclusively that the responsibility rests on the United Mine Workers of America which was trying to force its regime on the coal-mining industry of the State and that the trouble was neither agitated nor called because of differences between the workmen of Colorado and their employers. President Welborn states that, "although the strike has been broken, there has been no abatement of the spirit of lawlessness and treason against the State, which has been the guiding principle of the strike leaders."

The report shows that the quantity of iron ore mined in the fiscal year was 614,039 net tons, against 853,878 tons in the previous fiscal year; pig iron produced, 268,883 net tons, against 416,467 tons; coal mined, 2,428,992 net tons, against 4,091,667 tons; coke manufactured, 535,274 net tons, against 784,627 tons; finished iron and steel made, 352,929 net tons, against 458,521 tons.

The balance sheet as of June 30, 1914, shows a surplus of \$3,735,995.09, against \$4,732,240.51 on June 30, 1913, which is a decrease of \$996,245.42.

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## New Chinese Blast Furnaces May Ship to the United States

Z. T. K. Woo, superintendent Hanyang Iron & Steel Works, Hanyang, China, is in the United States to visit blast furnaces, steel works and by-product coking plants. The Hanyang Iron & Steel Works has plans for two new 400-ton blast furnaces and a by-product coking plant sufficient to supply all the required coke. The new furnaces will be built about 75 miles nearer the mouth of the Yangtse River than the present Hanyang works and they will have the added economy of proximity to the Tayeh iron mines of the company. These are about 15 miles distant from the new site. At present the coke ovens of the Hanyang Iron & Steel Works are at the coal mines, which are 240 miles distant from Hanyang. The coal supply for the new blast furnaces may be drawn from a field nearer to the proposed works; but in any event the haul from the coal mines now operated will be shorter. Ultimately a steel plant will be built at the Tayeh district site. Until the steel plant is provided the plan is to export practically all the output of the two new furnaces, the natural expectation being that freights via the Panama Canal will be low enough to permit of selling basic pig iron to Eastern works in the United States. The probabilities are that a considerable part of the equipment for the new blast furnaces will be placed in this country. The coke ovens will probably be of the Koppers type.

# The Iron and Metal Markets

## MORE PIG-IRON BUYING

### Growing Hopes for Finished Steel

Prices Have Yielded Further—New York Central  
Rail Inquiry—Large Pipe Business  
Pending

Pig-iron buying has increased; as to that there is no doubt. In finished steel markets the expectation of better buying just ahead is stronger, for inquiry has grown and in some lines the decline in orders has stopped. Many manufacturing consumers seem to be waiting for the reductions in labor cost which it is widely believed will become effective January 1. Whether prices meantime will discount them is the question close buyers are trying to answer.

Prices have been losing ground in the past ten days and are now, in bars, plates and shapes, close to the level at which there was free contracting late in 1911 and early in 1912. Conditions otherwise are not the same, it is true, and neither buyer nor seller would repeat the free commitments of that memorable movement.

Some agricultural works which bought only for this year have been sounding the bar market for 1915, though others have contracts running to July. Current sales are more often at 1.10c., Pittsburgh, than 1.15c., and in Ohio a 2500-ton inquiry is known to have brought a 1.05c. quotation from two mills.

The same tendency is seen in plates and structural steel. Sales of the former at 1.05c., Pittsburgh, are common, with mills running less than one-third capacity, while the low basis of some bids on structural steel is again attracting attention. The Bridge Builders' and Structural Society finds that in October 35 per cent. of the fabricating shop capacity of the country was contracted for against 38½ per cent. in September.

The export movement is still much below the average of the first six months of the year. The French contracts for 3½-in. shrapnel rounds went at low prices, about 18,000 tons being divided between two Pittsburgh companies.

Reported Russian and Norwegian inquiries for rails and the figuring of Russian and French commissioners now in New York on various lots of freight cars are still without tangible results.

The inquiry of the New York Central for 25,000 tons of rails is likely to result in winter rollings for one mill, at least. Otherwise the rail makers have little to relieve the prospect of a very lean winter. The Pennsylvania Steel Company has booked a 3500-ton order and the Ensley mill has a week's double-turn operation ahead. Rails were part of the cargo

of the first steamer of the new Mobile-San Francisco line which sailed from Mobile last week.

Tin-plate mills are reaching the end of the season and some contracts are practically negotiated for next year, with indications that a \$3.25 basis will be established. Sheet prices have sagged, with only 40 per cent. of capacity employed. Two or three aggressive sellers have taken business at 1.85c. for No. 28 black.

Our London cable tells of an advancing market for hematite iron. One Sheffield company has bought 100,000 tons. Several ship orders have added to the better feeling. The latest British embargo is on tin-plate shipments to Denmark, Holland and Sweden.

The cast-iron pipe trade is figuring on the largest contract in many months—25,000 tons of 6 to 48-in. pipe for Detroit, on which bids will be opened November 24. At Boston the Metropolitan Water and Sewerage Board is taking bids on 4000 tons of 60-in. pipe.

Ferromanganese is now a subject of diplomatic negotiation. It is believed at Washington that British shipments to this country will be resumed under guarantee against re-exports that might reach Germany. Higher prices have been asked here on some spot lots, but users are not showing enough anxiety to warrant them.

Pig-iron buying for the first quarter and in some cases the first half of next year has broadened. In the East the activity has been greatest. Several large lots were quietly closed, \$12, Buffalo, being readily done on contracts running to July. Smaller foundries have joined in the movement. A New York State rolling mill has bought 15,000 tons of gray forge iron.

St. Louis steel foundries have taken 15,000 tons of basic iron, chiefly from Chicago district steel makers. About 20,000 tons of basic is under inquiry for St. Louis and Central Western foundries.

Improvement in non-ferrous metals is a feature of the week. Copper, spelter and lead have advanced under increased demand, and all metal markets show activity after months of stagnation.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type,  
Declines in Italics

At date, one week, one month, and one year previous.

	Nov. 18,	Nov. 11,	Oct. 21,	Nov. 19,
<b>Pig Iron, Per Gross Ton:</b>	1914.	1914.	1914.	1913.
No. 2 X, Philadelphia...	\$14.50	\$14.50	\$14.50	\$15.50
No. 2, Valley furnace...	12.75	12.75	12.75	13.50
No. 2 Southern, Cin'ti...	12.90	12.90	12.90	13.75
No. 2, Birmingham, Ala...	10.00	10.00	10.00	10.50
No. 2, furnace, Chicago*	12.50	12.50	13.00	14.75
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.00
Basic, Valley furnace...	12.50	12.50	12.75	13.00
Bessemer, Pittsburgh...	14.55	14.55	14.90	15.90
Malleable Bess., Ch'go...	12.75	13.00	13.00	14.75
Gray forge, Pittsburgh...	13.40	13.40	13.40	14.25
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.25

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.



Billets, etc., Per Gross Ton:	Nov. 18, 1914.	Nov. 11, 1914.	Oct. 21, 1914.	Nov. 19, 1913.
Bess. billets, Pittsburgh.	\$19.00	\$19.50	\$20.00	\$20.50
O.-h. billets, Pittsburgh.	19.00	19.50	20.00	20.50
O.-h. sheet bars, P'gh.	20.00	20.00	20.50	21.00
Forging billets, base, P'gh.	24.00	24.00	25.00	26.00
O.-h. billets, Phila.	21.40	21.40	22.40	22.90
Wire rods, Pittsburgh.	25.00	25.50	26.00	26.00

Old Material, Per Gross Ton:	11.00	11.00	11.00	13.50
Iron rails, Chicago.	11.00	11.00	11.00	13.50
Iron rails, Philadelphia.	13.00	13.00	13.00	17.00
Carwheels, Chicago.	9.50	9.75	10.50	12.00
Carwheels, Philadelphia.	9.50	9.50	9.50	12.00
Heavy steel scrap, P'gh.	10.00	10.00	10.75	11.50
Heavy steel scrap, Phila.	9.25	9.25	9.50	10.00
Heavy steel scrap, Ch'go.	7.75	8.00	8.50	9.50
No. 1 cast, Pittsburgh.	10.50	10.50	11.50	12.00
No. 1 cast, Philadelphia.	11.00	11.00	11.00	12.50
No. 1 cast, Ch'go (net ton)	8.50	8.50	9.00	10.00

Finished Iron and Steel,	Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill		1.25	1.25	1.25	1.25
Iron bars, Philadelphia.		1.12	1.12	1.12	1.27 1/2
Iron bars, Pittsburgh.		1.15	1.15	1.15	1.40
Iron bars, Chicago.		0.95	0.95	1.00	1.15
Steel bars, Pittsburgh.		1.10	1.10	1.15	1.30
Steel bars, New York.		1.26	1.31	1.31	1.46
Tank plates, Pittsburgh.		1.05	1.10	1.15	1.25
Tank plates, New York.		1.26	1.26	1.31	1.41
Beams, etc., Pittsburgh.		1.10	1.10	1.15	1.30
Beams, etc., New York.		1.26	1.26	1.31	1.46
Skelp, grooved steel, P'gh		1.10	1.10	1.15	1.25
Skelp, sheared steel, P'gh		1.15	1.15	1.20	1.35
Steel hoops, Pittsburgh.		1.25	1.25	1.25	1.45

Sheets, Nails and Wire,	Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh		1.85	1.90	1.95	1.95
Galv. sheets, No. 28, P'gh		2.85	2.90	2.95	2.95
Wire nails, Pittsburgh.		1.60	1.60	1.60	1.60
Cut nails, Pittsburgh.		1.60	1.60	1.60	1.55
Fence wire, base, P'gh.		1.40	1.40	1.40	1.40
Barb wire, galv., P'gh.		2.00	2.00	2.00	2.00

Coke, Connellsville,	Per Net Ton at Oven:	\$1.50	\$1.50	\$1.60	\$1.80
Furnace coke, prompt.		1.50	1.50	1.60	1.80
Furnace coke, future.		1.75	1.75	1.75	2.00
Foundry coke, prompt.		1.90	1.90	2.00	2.60
Foundry coke, future.		2.15	2.15	2.15	2.75

Metals,	Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.		12.00	11.50	11.50	16.00
Electrolytic copper, N. Y.		11.87 1/2	11.25	11.25	15.25
Spelter, St. Louis.		4.95	4.80	4.85	5.15
Spelter, New York.		5.10	4.95	5.00	5.30
Lead, St. Louis.		3.62 1/2	3.40	3.35	4.20
Lead, New York.		3.70	3.50	3.50	4.35
Tin, New York.		32.50	34.25	29.00	40.15
Antimony, Hallett's, N. Y.		15.00	15.50	13.00	7.25
Tin plate, 100-lb. box, P'gh.		\$3.15	\$3.15	\$3.25	\$3.40

## Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

**Plates.**—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.05c., base, net cash, 30 days.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.10c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs, less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles.	.30
Hand rail tees.	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

**Wire Products.**—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Woven

wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.	Nos.	0 to 9	10	11	12	12 1/2	13	14	15	16
Annealed		\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10	\$2.20
Galvanized		2.00	2.00	2.05	2.10	2.20	2.30	2.40	2.50	2.60

**Wire Rods.**—Bessemer, open-hearth and chain rods, \$25 to \$25.50.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from November 2, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld					
Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1 $\frac{1}{2}$ , $\frac{3}{4}$ and $\frac{1}{2}$ .....	74	53 $\frac{1}{2}$	1 $\frac{1}{2}$ and $\frac{3}{4}$ .....	66	47
1 $\frac{1}{2}$ to 3.....	78	67 $\frac{1}{2}$	1 $\frac{1}{2}$ to 2.....	65	46
$\frac{3}{4}$ to 3.....	81	72 $\frac{1}{2}$	2 to 2 $\frac{1}{2}$ .....	69	56
			2 $\frac{1}{2}$ to 3.....	72	61
Lap Weld					
2.....	78	69 $\frac{1}{2}$	1 $\frac{1}{2}$ .....	56	45
2 $\frac{1}{2}$ to 6.....	80	71 $\frac{1}{2}$	1 $\frac{1}{2}$ to 2.....	67	56
7 to 12.....	77	66 $\frac{1}{2}$	2.....	68	58
13 and 14.....	63 $\frac{1}{2}$	..	2 $\frac{1}{2}$ to 4.....	70	61
15.....	61	..	4 $\frac{1}{2}$ to 6.....	70	61
			7 to 12.....	68	56

*Box Annealed Sheets, Cold Rolled*

	Cents per lb.
Nos. 10 and 11.....	1.50 to 1.55
No. 12.....	1.50 to 1.55
Nos. 13 and 14.....	1.55 to 1.60
Nos. 15 and 16.....	1.60 to 1.65
Nos. 17 to 21.....	1.65 to 1.70
Nos. 22 and 24.....	1.70 to 1.75
Nos. 25 and 26.....	1.75 to 1.80
No. 27.....	1.80 to 1.85
No. 28.....	1.85 to 1.90
No. 29.....	1.90 to 1.95
No. 30.....	2.00 to 2.05

*Galvanized Sheets of Black Sheet Gauge*

	Cents per lb.
Nos. 10 and 11.....	1.85 to 1.90
No. 12.....	1.95 to 2.00
Nos. 13 and 14.....	1.95 to 2.00
Nos. 15 and 16.....	2.10 to 2.15
Nos. 17 to 21.....	2.25 to 2.30
Nos. 22 and 24.....	2.40 to 2.45
Nos. 25 and 26.....	2.55 to 2.60
No. 27.....	2.70 to 2.75
No. 28.....	2.85 to 2.90
No. 29.....	3.00 to 3.05
No. 30.....	3.15 to 3.20

## Pittsburgh

PITTSBURGH, PA., November 17, 1914.

While a more hopeful feeling prevails, actual business booked by the mills has shown little if any increase, and prices seem to be losing ground. Sheets are slightly weaker and sheared plates have gone off further. As yet not enough business is being placed in semi-finished or finished lines to test prices, and what would be done on a large order for fairly prompt shipment is a question. It is not believed conditions will get any worse, and betterment is looked for soon after the first of the year. However, it is certain that the mills will not have steady work and prices cannot show much appreciation until the railroads are financially able to make purchases, and this seems to be a long way off. The opening of the Federal reserve banks will no doubt help the money situation, and this in time will permit the railroads to market securities at fair rates of interest. Raw materials, such as pig iron, coke and scrap, are practically stagnant. There is a little more inquiry for billets.

**Pig Iron.**—As yet the increased inquiry for Bessemer and basic iron noted last week has not developed into actual business. The American Steel Foundries is reported to be in the market for 5000 to 10,000 tons of basic iron for first half, but it is doubtful if any furnaces will sell at \$12.50 at furnace for delivery so far ahead. Some new business is being placed in high silicon and charcoal iron, but very little in the other grades. We quote Bessemer at \$13.60 to \$13.75; basic, \$12.50; No. 2 foundry, \$12.75 to \$13; malleable Bessemer, \$12.75, and gray forge, \$12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Pittsburgh district.

**Billets and Sheet Bars.**—More inquiry is reported for billets, but there is nothing doing in sheet bars beyond specifications on regular contracts. These from the sheet and tin-plate mills are growing less, as the tin-plate trade is slowing down a good deal and the new demand for sheets is not heavy. We quote Bessemer and open-hearth billets at \$19, and Bessemer and open-hearth sheet bars \$19.50, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, \$19, and Bessemer and open-hearth sheet bars, \$20, f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at \$24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take \$1 per ton extra. Axle billets are quoted at \$21 to \$22, f.o.b. Pittsburgh.

**Ferroalloys.**—The situation is mixed. Several Philadelphia dealers are still quoting 80 per cent. English ferromanganese at \$68, seaboard, but are asking a guarantee from buyers that it will not be re-exported to Germany. Offerings at less than \$68 from stock for prompt shipment have stopped, and as high as \$70 to \$75 is now quoted. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per cent., \$20, and 12 per cent., \$21, f.o.b. cars Jack-

son County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

**Steel Rails.**—Inquiries are reported from Russia for 30,000 tons of 67-lb. rails and 10,000 tons of 20-lb. rails, from Finland for 8000 tons, and from Norway for 20,000 tons. These reports cannot be confirmed here, the inquiries not having come to the local mill. The domestic demand for standard sections is only for small lots for prompt shipment, and the new demand for light rails is dull, running only 1000 to 1200 tons per week. We quote standard section rails, made of Bessemer stock, at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. Extras over the above prices are as follows:

Bond drilling, one hole.....	\$0.045 per 100 lb.
Bond drilling, two holes.....	0.090 per 100 lb.
Bond drilling, one hole in flange.....	0.090 per 100 lb.
Bond drilling, two holes in flange.....	0.180 per 100 lb.
All 30 ft. and special lengths, down to but not including 12 ft.....	0.045 per 100 lb.
Special lengths, 12 ft. and under.....	0.090 per 100 lb.
Notching.....	0.025 per 100 lb.

The above prices are for carload lots, the usual differentials being allowed for large lots.

**Structural Material.**—New inquiry has been light. It is understood that the steel for the new Schenley high school in this city, about 1300 tons, has been placed with the Riter-Conley Mfg. Company. The McClintic-Marshall Company has taken 130 tons for the roof of filtration beds at Cleveland and 160 tons of elevated work in New York City. We quote beams and channels up to 15-in. at 1.10c., f.o.b. Pittsburgh. On a desirable order, this price would be shaded.

**Plates.**—The demand shows no betterment and prices seem to be weaker. The current demand does not represent more than 25 to 35 per cent. of mill capacity. We quote ¼-in. and heavier plates at 1.05c. to 1.10c., the lower price being for desirable orders.

**Wire Rods.**—Some fair-sized orders for wire rods for shipment to England are being placed with local mills on the basis of \$24.50 to \$25, Pittsburgh. There is practically no domestic demand and specifications against contracts are dull. For domestic business we quote Bessemer, open-hearth and chain rods at \$25 to \$25.50, f.o.b. Pittsburgh.

**Skelp.**—There is very little new demand and all the mills that make skelp are badly in need of orders. Some foreign inquiries, mostly from England, are in the market. We quote: Grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.45c. to 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

**Tin Plate.**—The season is fast drawing to a close, and mill operations are steadily decreasing. One leading local maker that has 32 mills is now operating only 20, and on reduced time. The American Sheet & Tin Plate Company is operating to 50 to 60 per cent. of capacity. As yet, none of the mills has named prices for delivery over 1915, but they are expected to do so shortly. The present demand is light and only for small lots. We quote 100-lb. 14 x 20 coke plates for prompt delivery from stock at \$3.25 per box, but for a desirable order this price would be shaded. We quote 100-lb. 14 x 20 terne plates at \$3.10 to \$3.20 per box, f.o.b. Pittsburgh.

**Sheets.**—While new orders for sheets and specifications against contracts are reported by some mills to be slightly better, prices do not show any improvement, largely due to the aggressive attitude of two or three mills that are evidently keen to get orders. Some mills will not quote for delivery beyond this month and December at present prices, believing that early in 1915 there will be a better demand. Mill operations are from 40 to 50 per cent. We quote No. 28 Bessemer black sheets at 1.85c. to 1.90c.; No. 28 galvanized, 2.85c. to 2.90c.; Nos. 9 and 10 blue annealed, 1.35c. to 1.40c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24,

1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

**Wire Products.**—There is a steady foreign inquiry for barb wire from England, Russia and France, but no single inquiry at present is in the market calling for as much as 5000 tons, as rumored. It is a fact, too, that inquiries sent out often dwindle to small proportions when the order is actually placed. A recent case is that of an inquiry for 2000 tons, but which finally resulted in a specific order for 300 tons. There is also some foreign demand for fence wire and for wire nails, though not nearly so heavy as for barb wire. The domestic demand for wire and wire nails is quiet, and prices are weak. Wire nails have sold at \$1.55 and plain wire at \$1.35. We quote wire nails at \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at \$1.60 to \$1.65, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots and 71 on smaller lots, all f.o.b. Pittsburgh.

**Shafting.**—Makers report the new demand quiet and specifications from general consumers light. The automobile builders are still taking in a moderate amount of shafting, but not so much as some time ago. At present the new demand is not more than 25 per cent. of capacity, and it is claimed that the prices at which shafting is selling leave little or no margin of profit. We quote cold-rolled shafting at 66 to 67 per cent. off, depending on the order, delivered in base territory.

**Iron and Steel Bars.**—Specifications against contracts are unsatisfactory and the new demand continues light. Prices on steel bars are weak. While 1.10c. is maintained in this territory, in other sections they are selling on the basis of 1.05c., Pittsburgh. Shipments by mills are lighter. Some inquiry is being received for first quarter and first half, but makers are not disposed to sell so far ahead at present prices. It is stated that some business in steel bars has been closed for first quarter at 1.15c. to 1.20c., at mill. The new demand for iron bars is dull. We quote steel bars at 1.10c. for delivery over the remainder of the year, while for first quarter 1.15c. is being named. We quote common iron bars at 1.15c. to 1.20c., f.o.b. Pittsburgh.

**Railroad Spikes.**—Railroads are making no new purchases, and are not specifying against contracts placed early in the year. We quote standard sizes of railroad and boat spikes at \$1.35 to \$1.40, and smaller railroad and boat spikes at \$1.45 to \$1.50 per 100 lb. in carload and larger lots, f.o.b. Pittsburgh.

**Nuts, Bolts and Rivets.**—There is no betterment in demand, which is only for small lots to meet current needs. Specifications against contracts are dull, and low prices are still being named by several makers of nuts and bolts that have heavy stocks. The new demand for boiler and structural rivets is quiet, as the structural and boiler shops are not running to more than 30 to 35 per cent. of capacity. We quote structural rivets at 1.45c. and boiler rivets at 1.55c. in carload lots, small lots taking an advance of about 10c. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	.....80 and 5% off
Small carriage bolts, cut threads	.....80% off
Small carriage bolts, rolled threads	.....80 and 5% off
Large carriage bolts	.....75 and 5% off
Small machine bolts, cut threads	.....80 and 5% off
Small machine bolts, rolled threads	.....80 and 10% off
Large machine bolts	.....75 and 10% off
Machine bolts, c.p.c. & t nuts, small	.....80% off
Machine bolts, c.p.c. & t nuts, large	.....75 and 5% off
Square h.p. nuts, blank and tapped	.....\$6.30 off list
Hexagon nuts	.....\$7.20 off list
C.P.C. and r sq. nuts, blank and tapped	.....\$6.00 off list
Hexagon nuts, 1/2 in. and larger	.....\$7.20 off list
Hexagon nuts, smaller than 1/2 in.	.....\$7.80 off list
C.P. plain square nuts	.....\$5.50 off list
C.P. plain hexagon nuts	.....\$5.90 off list
Semi-fin. hex. nuts, 1/2 in. or under	.....85, 10 & 10% off
Semi-fin. hex. nuts, 3/4 in. and larger	.....85 & 5% off
Rivets, 7/16 x 6 1/2, smaller & shorter	.....80, 10 & 5% off
Rivets, tin plated, packages	.....80, 10 and 5% off
Rivets, metallic tinned, packages	.....80, 10 and 5% off
Standard cap screws	.....70, 10 and 10% off
Standard set-screws	.....75, 10 and 10% off

**Hoops and Bands.**—New business is light and only for small lots for prompt shipment. Specifications against contracts are generally dull, but some fair specifications for hoops are coming from the Pacific coast. We quote steel bands at 1.10c., and steel hoops at 1.25c., f.o.b. Pittsburgh, but on desirable orders these prices would be shaded probably \$1 a ton.

**Merchant Steel.**—Specifications against contracts for seasonable steels, such as are used by implement makers, are reported a little better, but the general demand is light and only for small lots to meet current wants. Indications for general improvement in this trade in the near future are not encouraging. Prices depend largely on the size of the order and the deliveries wanted. Quotations on small lots for prompt shipment are about as follows: Iron finished tire, 1/2 x 1 1/2 in. and larger, 1.30c., base; under 1/2 x 1 1/2 in., 1.45c.; planished tire, 1.50c.; channel tire, 3/4 to 1 in., 1.80c. to 1.90c.; 1 1/2 in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

**Standard Pipe.**—The new demand for standard iron and steel pipe is quiet and does not represent more than 35 to 40 per cent. of capacity of the mills. It is believed, however, that early in 1915 the demand will be much better. This is predicated on the experience of previous years. No large gas or oil lines are in the market. It is not improbable that a new lower card of discounts on iron pipe may be sent out in the near future, to meet the reduction recently made on steel pipe. New discounts on steel pipe are well maintained.

**Boiler Tubes.**—There is no improvement in demand for locomotive or merchant tubes. Prices are more or less demoralized, little attention being paid to the regular discounts.

**Old Material.**—The local scrap market seems to be almost dead. There is practically no buying by consumers, and trading is only among dealers who are buying material to apply on contracts. The consumption of all kinds of scrap is light, as mills that use it are not running to more than 35 to 40 per cent. of capacity. Not enough new business is going to test prices. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	.....\$10.00
Compressed side and end sheet scrap	.....\$9.00 to 9.25
No. 1 foundry cast	.....10.50 to 10.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	.....8.00 to 8.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	.....11.75 to 12.00
No. 1 railroad malleable stock	.....10.00 to 10.25
Railroad grate bars	.....9.00 to 9.25
Low phosphorus melting stock	.....13.00
Iron car axles	.....18.75 to 19.25
Steel car axles	.....13.25 to 13.75
Locomotive axles, steel	.....19.75 to 20.25
No. 1 busheling scrap	.....9.00 to 9.25
No. 2 busheling scrap	.....6.00 to 6.25
Machine shop turnings	.....7.25
Old carwheels	.....10.75 to 11.00
Cast-iron borings	.....7.75
*Sheet bar crop ends	.....10.50 to 10.75
Old iron rails	.....12.75 to 13.00
No. 1 railroad wrought scrap	.....10.75 to 11.00
Heavy steel axle turnings	.....8.25 to 8.50
Heavy breakable cast scrap	.....10.25 to 10.50

\*Shipping point.

**Coke.**—Some inquiry has come out for furnace coke for first half, but the only contract closed is one for an Eastern consumer, based on a sliding scale, which has been renewed. In view of the expected reductions in wages about January 1, consumers are holding off, believing that if general wage reductions are made they will include coke workers, and coke may then be bought to better advantage. We quote standard makes of blast-furnace coke for prompt shipment at \$1.50 to \$1.60 per net ton at oven; standard makes of 72-hr.



foundry coke, \$1.90 to \$2 per net ton at oven for prompt delivery. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended November 7 as 211,554 net tons, an increase over the previous week of 5590 tons.

## Chicago

CHICAGO, ILL., November 18, 1914.—(By Wire.)

Interest rates at Chicago have been officially dropped from 7 to 6 per cent., coincident with the opening of the Federal reserve bank. The financial atmosphere which has prevailed for several months has been such a dominant factor in determining business sentiment that the improvement thus indicated is important. Nor is the market tone insensible to the progress that is being made in clearing the channels of trade, and a much better feeling prevails. Contracting for structural steel for first-quarter delivery has been inaugurated on the basis of 1.10c., Pittsburgh, but the movement has not yet gathered any particular momentum. Specifications during the week were slightly improved, and of structural steel involved in bridge inquiry and orders for car and building materials an aggregate of about 7500 tons is noted. Intermittent mill activity finds the current week showing a little heavier scale of operation, but nothing more is being done than the necessary filling of accumulated orders requires. The St. Paul Railroad renews its announcement of \$13,000,000 expenditure for electrifying its Rocky Mountain Division in connection with its purchase of an electric locomotive for that purpose. A report is also current of an inquiry from the Lake Shore for 25,000 tons of rails. Inquiry for pig iron includes a few new tonnages but none is of great importance. The inquiry for 10,000 tons of basic pig iron for a prominent steel foundry is still open. Negotiations are under way involving the placing of a very substantial tonnage of cast-iron pipe.

**Pig Iron.**—Inquiry engaging the attention of merchant furnaces in this market is still limited to a few lots under 1000 tons, part of this for southern Ohio delivery. The activity of steel company furnaces, which has been most recently connected with the sale of 5000 tons of basic to an East St. Louis foundry, continues the principal factor in establishing local prices. The remainder of the inquiry of the American Steel Foundries, amounting to 10,000 tons for its plants at Alliance and Sharon, encounters other market conditions than are peculiar to the local situation and is still open. Merchant interests in the Lake district are adhering very generally to the basis of \$13 at furnace for their standard irons and are still asking a premium for forward delivery. For Southern iron, inquiry is being solicited for first quarter at \$10, Birmingham. In response to an increasing demand for higher manganese irons, one of the Alabama interests has appreciably raised its grading in that respect. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	.....	\$15.75 to \$16.75
Northern coke foundry, No. 1	.....	13.25 to 13.75
Northern coke foundry, No. 2	.....	12.50 to 13.00
Northern coke foundry, No. 3	.....	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	.....	14.50 to 14.75
Southern coke, No. 2 f'dry and 2 soft	.....	14.00 to 14.25
Malleable Bessemer	.....	12.75 to 13.25
Standard Bessemer	.....	15.50
Basic	.....	12.25 to 12.50
Low phosphorus	.....	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	.....	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	.....	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	.....	18.90 to 19.40

(By Mail)

**Rails and Track Supplies.**—Inquiry which has been current for track supplies for first-half delivery has not yet developed any business except for some small tonnages of tie plates. A report is noted that the New York Central Lines have made inquiry for 25,000 tons of rails but this market has not yet officially received it. We quote standard railroad spikes at 1.45c. to 1.50c., base; track bolts with square nuts, 1.85c. to 1.90c., base,

all in carload lots, Chicago; tie-plates, \$25 to \$27, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—One of the steel companies at Pittsburgh has opened negotiations for contracts covering steel for first-quarter shipment on the basis of 1.10c., Pittsburgh, and there has developed a moderate activity in this direction. A number of the mills, however, are reluctant to consider contracts and the movement is not yet general. For prompt shipment business 1.25c., Chicago, continues available. Specifications during the past week were slightly improved in tonnage, the orders placed including 3000 tons of car steel of which half is for passenger equipment and half for underframes for the Pennsylvania Railroad. The Morava Construction Company ordered about 800 tons to apply on its contract just secured for the Second Regiment Armory at Chicago. There is also a fair inquiry for bridge steel. We quote for Chicago delivery of plain material from mill 1.25c. to 1.28c.

We quote for Chicago delivery of structural shapes from store 1.75c.

**Plates.**—A small tonnage of plates for tank work and bridge spans comprises the bulk of the business available to the plate mills. Beyond this the market suggests little comment of interest. We quote for Chicago delivery of plates from mill 1.25c. to 1.28c.

We quote for Chicago delivery of plates from store 1.75c.

**Sheets.**—Sheet users are showing some disposition to contract but the mills are not very keen to commit themselves. Specifications are slightly improved and further concessions in prices do not seem to be apparent. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.53c.; No. 28 black, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

**Bars.**—The market for bars, in so far as there is any business going, is simply following the general trend without much change as to quantity and with none as to price. There is a disposition on the part of some of the mills to get away from the minimum prices which have prevailed for bar iron but our quotation remains unchanged. Hard steel bars are going at about 1.20c. We quote for mill shipments as follows: Bar iron, 0.95c. to 1.05c.; soft steel bars, 1.25c.; hard steel bars 1.20c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

**Rivets and Bolts.**—Recent bolt orders have been on a more liberal scale. Irregularities in prices continue to rule, concessions being especially prominent for large carriage and machine bolts. Quotations are as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 85; cut thread, 80-20; larger sizes, 80; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, \$6.60 off per cwt.; hexagon, \$7.60 off per cwt. Structural rivets,  $\frac{3}{4}$  to 1 $\frac{1}{4}$  in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to  $\frac{3}{4}$  x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, \$6, and hexagon, \$6.70 off per cwt.

**Wire Products.**—The general reduction in the price of wire products equivalent to about \$1 a ton bears witness to the lack of business in this territory. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.18, all Chicago.

**Cast-Iron Pipe.**—A very large municipal tonnage is expected to come into the market in the next few weeks. Last week produced no business deserving of mention. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

**Old Material.**—The scrap market presents a monotonous scarcity of buying by the melters and an unchecked decline in values. No change can be expected in this programme until the situation improves as regards the marketing of finished products. The Chicago & Alton is asking prices on 1200 tons of scrap. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$11.00 to \$11.25
Old steel rails, rerolling	9.50 to 10.00
Old steel rails, less than 3 ft.	9.25 to 9.50
Old carwheels	9.50 to 10.00
Heavy melting steel scrap	7.75 to 8.25
Frogs, switches and guards, cut apart	8.00 to 8.50
Shoveling steel	7.50 to 8.00
Steel axle turnings	6.50 to 7.00

Per Net Ton	
Iron angles and splice bars	\$10.25 to \$10.75
Iron arch bars and transoms	10.25 to 10.50
Steel angle bars	7.25 to 7.75
Iron car axles	13.75 to 14.00
Steel car axles	10.25 to 10.75
No. 1 railroad wrought	7.50 to 7.75
No. 2 railroad wrought	7.00 to 7.25
Cut forge	7.00 to 7.25
Steel knuckles and couplers	8.00 to 8.50
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	4.50 to 4.75
Cast borings	4.50 to 4.75
No. 1 bushelling	6.50 to 6.75
No. 2 bushelling	5.50 to 5.75
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
Boiler punchings	7.75 to 8.00
No. 1 cast scrap	8.50 to 8.75
Stove plate and light cast scrap	7.75 to 8.25
Grate bars	7.25 to 7.75
Railroad malleable	7.75 to 8.00
Agricultural malleable	7.25 to 7.50
Pipes and flues	5.50 to 5.75

## Philadelphia

PHILADELPHIA, PA., November 17, 1914.

Taking the market as a whole, there can be no question that the better tone recently referred to has developed into actual improvement in orders for miscellaneous materials, though in a few spots demand is as poor or even worse than it was before the trade began to feel encouraged. Low prices are a bad feature so far as the mills are concerned, it being difficult for them to obtain more than 1.25c., Philadelphia, for plates, shapes and bars in any quantities that run larger than what might be called jobbing lots. At the low prices sellers are most reluctant to enter contracts extending into next year, though in some cases this has been done. In pig iron there has been a fair movement as compared with recent lack of activity, the business being done at low competitive prices. A little improvement in demand is shown in bars and in some directions in plates, but structural material remains in an unsatisfactory state. Billets are dull. The demand for sheets has fallen off sharply and the immediate future presents no brighter prospects. The scrap market is stagnant. There is little or no new demand for ferromanganese and the restriction placed by England upon its importation here does not seem to be considered a cause for worry.

**Iron Ore.**—Nothing of interest is presented in the ore market. The only importation reported last week at this port was 11,300 tons from Cuba.

**Pig Iron.**—In foundry grades there is a decided betterment in inquiry and sales despite the fact that deliveries do not show much improvement. It is evident that the need of providing for the remainder of the year and into the first quarter of 1915 is becoming more pressing while there is a realization on the part of consumers that this is a time to buy cheap iron, the latter being true to an extent which is unpleasant for sellers to contemplate. Some of the eastern Pennsylvania furnaces have met the \$12 furnace, or \$14.45, Philadelphia, price made by certain Buffalo producers. Transactions mentioned by the trade include the buying of 1500 tons of No. 2 X by one jobbing foundry

and over 500 tons by another; 500 tons by a maker of pipe and fittings; in the neighborhood of 1000 tons by a Virginia pipe foundry and about 2000 tons by a local pipe maker. A manufacturer of soil pipe is about to enter the market for 2000 tons, probably No. 2 plain, and a stove manufacturer who has been sounding sellers is expected to buy about 2000 tons of No. 2 X. An inquiry is out for 500 tons of malleable. Other and mostly smaller lots have been sold or are the subject of inquiries. A maker of Virginia iron who sold 1600 tons last week asserts that while his customers are ordering more they are not increasing their deliveries and admits that the sale of Virginia iron has been hurt by the low price made at Buffalo. It is reported that one seller at the latter point has withdrawn the low quotation referred to. There has been no action in Southern iron. Basic and low phosphorus remain dull. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	\$14.50 to \$14.75
Eastern Penna. No. 2 plain	14.25 to 14.50
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.50 to 13.75
Basic	14.00
Standard low phosphorus	20.00 to 21.00

**Ferroalloys.**—The market for 80 per cent. ferromanganese is nominal at \$68, seaboard, according to representatives of English producers. Some holders other than the agents referred to are looking for \$75 for the stock they have. The lack of demand is attributed to the fact that most consumers are reasonably well supplied in view of the lessened need they now have for ferromanganese. The restriction recently placed upon the exportation of the alloy from England has not so far created any outward uneasiness for the reason that it is understood that England will permit exports where a guarantee is written into the contracts by responsible parties that importations will be consumed by them alone and under no circumstances reshipped to other buyers, domestic or foreign. Negotiations to perfect this arrangement are now under way. An appeal was first made to the United States Government to forbid reshipment to other countries but this the Government could not do. Importations in the week ended November 14 totaled 916 tons, shipments having been increased at the request of English producers about two weeks ago. The quotation for 50 per cent. ferrosilicon continues at \$71 to \$73, Pittsburgh, depending on quantity ordered.

**Bars.**—There was a betterment in the aggregate of steel bars sold last week, though there were no large orders received. Where a good-sized quantity is involved 1.25c., Philadelphia, can be easily obtained, for prompt delivery, and some sales have been made into the first quarter on this basis, though makers are reluctant to enter such contracts. A sale of 60 tons was made at 1.12½c., Pittsburgh, for shipment to western New York. Sellers endeavor to get 1.30c., Philadelphia, for first quarter and at least 1.35c. for second quarter. Iron bars are weak at 1.12c., Philadelphia, which is equal to 1.05c. at nearby Eastern mills. A bridge at Washington, to be erected for the District of Columbia, will require 150 tons of steel reinforcing bars.

**Plates.**—Specifications and new business have been a shade better, with the bulk of the transactions involving small and miscellaneous lots. Inquiries for contracts into next year are coming out more freely with the expectation of getting the present low price. Some mills are refusing to sell at 1.25c., Philadelphia, beyond the end of this year. Requirements for plates for boiler work are more numerous. The betterment referred to is not general, the demand on some of the makers continuing very light.

**Billets.**—The demand continues dull and the quotation is unchanged at \$21.40 for open-hearth rolling billets. A local mill sees so little business ahead that it contemplates shutting down its open-hearth furnaces and will blow out its last active blast furnace November 19.

**Structural Material.**—In this territory there continues to be a dearth of undertakings which would furnish business for local mills. The quotations for early de-

livery range from 1.25c. to 1.30c., according to the quantity of material and delivery wanted. Bids are being asked by the Navy Department, Bureau of Yards and Docks, Washington, for a warehouse which it is estimated will take 1000 tons.

**Sheets.**—A large local producer is running nearly to capacity this week, but lacks business for the immediate future. It is noted that consumers are keeping contracts alive, but are slow in specifying. Some of these contracts were entered to cover the third quarter of this year. The quotation for No. 10 blue annealed sheets is 1.50c. to 1.55c., Philadelphia.

**Coke.**—Nothing of interest has developed and quotations for prompt shipments continue at about \$1.60 per net ton at oven for prompt furnace coke and \$2.10 to \$2.50 for foundry. Freight rates to this city from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85 and Mountain, \$1.65.

**Old Material.**—Dealers continue to be hopeful, though business has not yet improved. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$9.25 to	\$9.50
Old steel rails, rerolling.....	11.50 to	12.00
Low phosphorus heavy melting steel scrap .....	13.50 to	14.00
Old steel axles.....	13.00 to	13.50
Old iron axles.....	17.50 to	18.00
Old iron rails.....	13.00 to	14.00
Old carwheels.....	9.50 to	10.00
No. 1 railroad wrought.....	11.50 to	12.00
Wrought-iron pipe.....	9.50 to	10.00
No. 1 forge fire.....	8.00 to	8.50
Bundled sheets.....	8.00 to	8.50
No. 2 busheling.....	7.75 to	8.25
Machine shop turnings.....	7.50 to	8.00
Clean cast borings.....	7.50 to	8.00
No. 1 cast.....	11.00 to	12.00
Grate bars, railroad.....	8.00 to	8.50
Stove plate.....	8.00 to	8.50
Railroad malleable.....	9.00 to	9.50

## Buffalo

BUFFALO, N. Y., November 17, 1914.

**Pig Iron.**—The tone of the market is better, with more signs of life. Booking has been heavier than for some weeks, aggregating probably 15,000 tons of foundry and malleable grades and principally for this quarter shipment. This total is made up almost entirely of small orders, consumers being conservative in their purchases, but in many instances urgently requesting rush shipments. Quite a large proportion of this business was for shipment into Eastern territory, and contracts are still pending for a considerable tonnage for the same destination. Prices are far from satisfactory from the producers' point of view and current prices for first-quarter shipment are not attractive to many of them; in fact, some furnaces have already advanced their schedule for first-half delivery 50c. per ton, with a minimum of \$12.50, f.o.b. cars at furnace, for No. 2 X foundry. The Wickwire Steel Company announces that one of its furnace stacks will go out of blast for an indefinite period in about a week. For delivery over the remainder of this year we quote as below, with 50c. per ton additional for first half of next year, f.o.b. furnace:

No. 1 foundry.....	\$12.50 to	\$12.75
No. 2 X foundry.....	12.00 to	12.50
No. 2 plain.....	12.00 to	12.50
No. 3 foundry.....	12.00 to	12.50
Gray forge.....	12.00 to	12.50
Malleable.....	12.25 to	12.50
Basic.....	13.25 to	13.75
Charcoal, regular grades and analysis.....	16.25 to	17.25
Charcoal, special grades and analysis.....	20.50	

**Finished Iron and Steel.**—Continued improvement in sentiment is noted, although actual sales have not shown an increase in volume, being confined almost entirely to small lot business. Some interest among buyers is noted concerning contracts for business into next year, indicating that an increasing number of users of finished products believe the turn in prices is at hand and nothing will be gained by further delay in ordering. Sellers, however, are not soliciting 1915 business at current prices. Fabricators report some improvement in inquiry for structural material. Bids go in today for 200 tons of steel for the Union high school addition, Lockport, N. Y. Bids will also be taken this

week for public school No. 26, Rochester, and next week for an addition to the Iola Sanitarium in that city, each structure taking about 150 tons. Figures will soon be advertised for steel for an addition to the Erie County jail, Buffalo, and a vocational school at Syracuse. The F. L. Hughes Company, Rochester, has the contract for steel for a substation of the telephone exchange in that city, 100 tons.

**Old Material.**—The market continues stagnant, with an almost complete absence of demand and only insignificant sales, confined to a few lines. Prices are unchanged from last week. We quote dealers' selling prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$9.00 to	\$9.50
Low phosphorus steel.....	12.50 to	13.00
No. 1 railroad wrought scrap.....	9.00 to	9.50
No. 1 railroad and machinery cast.....	9.25 to	9.75
Old steel axles.....	11.00 to	11.50
Old iron axles.....	16.00 to	16.50
Old carwheels.....	9.50 to	10.00
Railroad malleable.....	8.50 to	9.00
Machine shop turnings.....	5.25 to	5.75
Heavy axles turnings.....	7.50 to	8.00
Clean cast borings.....	5.00 to	5.50
Old iron rails.....	10.50 to	11.00
Locomotive grate bars.....	8.00 to	8.50
Stove plate (net ton).....	8.00 to	8.50
Wrought pipe.....	6.50 to	7.00
Bundled sheet scrap.....	5.75 to	6.25
No. 1 busheling scrap.....	7.00 to	7.50
No. 2 busheling scrap.....	5.00 to	5.25
Bundled tin scrap.....		10.00

## Cincinnati

CINCINNATI, OHIO, November 18, 1914.—(By Wire.)

**Pig Iron.**—The week opens with a very decided improvement in the situation. This statement should not be construed as indicating that business is yet up to normal for the season. But the improvement is so marked that it is a matter of common comment. Although the majority of foundry melters in this vicinity are slow in contracting for large amounts to be shipped the first half of next year, several deals have been closed that are worthy of notice, among which is one covering 1000 tons of Northern iron for a central Ohio consumer. A western Ohio melter took 500 tons of Southern No. 2, and 1500 tons of the same grade of iron was contracted for by a northern Ohio firm. Approximately 500 tons of Southern No. 2 was bought by a Missouri company, and several other deals of like magnitude have been closed which cannot be reported. The prompt shipment carload business also shows improvement, and as both buyers and sellers are in a more optimistic mood the near future may show some surprising developments as compared with the record of the past few weeks. Inquiries being figured on include one from northern Indiana for 500 tons of Northern No. 1, and a southern Indiana concern will soon buy 1500 tons of mixed grades including both Northern and Southern irons. There is also a fair-sized order in view from central Ohio. Malleable is very quiet. The latest inquiry for basic is for 10,000 tons from the St. Louis district for first half. Prices are firm at \$10, Birmingham, and \$13, Iron-ton, for either prompt or first half delivery. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.....	\$13.40 to	\$13.90
Southern coke, No. 2 f'dry and 2 soft.....	12.90 to	13.40
Southern coke, No. 3 foundry.....	12.40 to	12.90
Southern No. 4 foundry.....	11.90 to	12.40
Southern gray forge.....	11.40 to	11.90
Ohio silvery, 8 per cent. silicon.....	17.20 to	17.70
Southern Ohio coke, No. 1.....	15.26 to	15.76
Southern Ohio coke, No. 2.....	14.26 to	14.76
Southern Ohio coke, No. 3.....	14.01 to	14.26
Southern Ohio malleable Bessemer.....		14.26
Basic, Northern.....	14.51 to	15.01
Lake Superior charcoal.....	15.25 to	17.25
Standard Southern carwheel.....	26.90 to	27.40

(By Mail)

**Coke.**—A furnace operator in southern Ohio has contracted for 35,000 tons of Pocahontas coke for delivery through first half. This is the only notable sale of furnace coke in this territory. Considerably more business in domestic coke is reported, although the amounts are relatively small. A great deal of foundry coke due on this year's contracts will probably be used to bridge over into first quarter. A number of jobbing foundries in this immediate vicinity are buying carload quantities for prompt shipment. Connellsville furnace coke is quoted at \$1.60 to \$1.70 per net ton at oven,



with foundry grades ranging from \$2 to \$2.25 for prompt and future shipment. Wise County and Poca-hontas coke is quoted 10c. to 25c. a ton above these prices.

**Finished Material.**—Mill agencies report a few more inquiries from different sources, covering iron and steel bars and small structural shapes, but there is little actual business. Warehouse stocks are able to take care of the less than carload tonnage offered. Local store prices on steel bars and structural shapes are unchanged at 1.80c. There is a better demand for galvanized sheets for prompt shipment, although most orders are for carload lots. No. 28 black sheets are quoted at 2.058c. Cincinnati, or Newport, Ky., and galvanized at 3.058c. Track material is not in much demand.

**Old Material.**—Both the Pennsylvania and Baltimore & Ohio railroads are said to have out lists, and other railroads are known to have a considerable tonnage of scrap on hand. The demand is still slack, and the increase in the consumption on account of a number of nearby foundries is a negligible proposition, considering the large stocks in yards. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap.....	\$6.00 to \$6.50
Old iron rails.....	10.75 to 11.75
Relaying rails, 50 lb. and up.....	19.50 to 20.00
Rerolling steel rails.....	9.50 to 10.00
Melting steel rails.....	8.50 to 9.00
Heavy melting steel rails.....	8.25 to 8.75
Per Net Ton	
No. 1 railroad wrought.....	\$7.25 to \$7.75
Cast borings.....	3.75 to 4.25
Steel turnings.....	3.75 to 4.25
Railroad cast scrap.....	9.00 to 9.50
No. 1 machinery cast scrap.....	9.50 to 10.00
Burnt scrap.....	5.75 to 6.25
Old iron axles.....	13.25 to 13.75
Locomotive tires (smooth inside).....	8.50 to 9.00
Pipes and flues.....	5.25 to 5.75
Malleable and steel scrap.....	6.50 to 7.00
Railroad tank and sheet scrap.....	4.25 to 4.75

Eaton, Rhodes & Co., Cincinnati, have sold 100,000 tons of Solvay coke to an Ironton furnace, shipments to be distributed through 1915.

## Cleveland

CLEVELAND, OHIO, November 17, 1914.

**Iron Ore.**—The last ore cargoes are scheduled to be shipped from Superior next Monday. Duluth was the first upper lake port to get through this year, the last cargoes being sent from that port November 10. Some ore will be shipped from Escanaba late this week. We quote prices as follows: Old Range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.85.

**Pig Iron.**—Not many sales are reported but the slightly improved volume of inquiries noted a week ago continues. This is mostly for small lots of foundry iron for delivery after January 1. With the present limited operation of the foundries, and the fact that many consumers will carry iron over until next year, furnacemen do not look for much activity during the next few weeks. Conditions have improved with the Ohio stove foundries, but most of these have good sized stocks of finished product on hand. Southern iron is more active than Northern at present. We note the sale of a 1000-ton lot and a 500-ton lot to a local consumer for the first half on the basis of \$10, Birmingham, for No. 2 and a few smaller lots. Several inquiries are pending, including one for 1000 tons of Southern iron from a northern Ohio stove foundry. On foundry iron \$12.75 for No. 2 is the prevailing minimum quotation by Cleveland and Valley furnaces. A report that foundry iron has been offered as low as \$12.50, Valley furnace, lacks confirmation. We quote Cleveland delivery as follows:

Bessemer.....	\$14.70
Basic.....	13.45
Northern No. 2 foundry.....	\$13.25 to 13.75
Southern No. 2 foundry.....	14.00
Gray forge.....	13.00
Jackson Co. silvery, 8 per cent. silicon.....	17.62
Standard low phos., Valley furnace.....	20.00

**Coke.**—The market is dull, the only sales reported being small lots of foundry coke, for early shipment. Sales are being made at \$2.25 to \$2.35 for the best grades. We quote standard foundry furnace coke for prompt shipment at \$1.50 to \$1.60 per net ton at oven.

**Finished Iron and Steel.**—The improved sentiment in the steel trade noted last week is still apparent, but the improvement in orders so far is very light. Weakness in the steel bar market has developed and in a few cases buyers have succeeded in forcing down the price to 1.05c., Pittsburgh. A local inquiry for 2500 tons is understood to have brought out that quotation from two mills. With the prevailing low prices consumers are making inquiries for material for the first quarter, hoping to be able to contract for that delivery at current prices. The 1.05c. quotation on plates noted last week is being made quite freely by some of the smaller mills. Considerable new work in structural lines is in the hands of architects and several jobs for which inquiries are out will be placed shortly. These include the passenger boat docks in Cleveland, 500 tons, the general contract for which has been let to George Cooke, Detroit, Mich. The Brookville Bridge Company, Brookville, Ohio, has taken 600 tons for a bridge in Dayton. Bids will be taken this week for 200 tons for Charity Hospital, Cleveland. Fabricated work is at present being taken at unusually low prices. The demand for sheets shows some improvement and business is being placed at the ruling prices of 1.90c. for No. 28 black, 2.90c. for No. 28 galvanized, and 1.35c. for blue annealed. Sheet bars are quoted at \$19.50, Youngstown, but reports indicate that this price can be shaded 50c. The demand for iron bars continues very light. We quote iron bars at 1.10c. to 1.15c. for Cleveland delivery. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

**Bolts, Nuts and Rivets.**—The demand for bolts and nuts is light and prices are weak. There is little new inquiry for rivets, as most consumers are under contract. We quote structural rivets at 1.45c. and boiler rivets at 1.55c. for carload lots, and \$1 a ton higher for smaller lots. Discounts are as follows: Common carriage bolts,  $\frac{3}{8}$  x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h.p. nuts,  $\frac{3}{8}$  x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon  $\frac{3}{8}$  in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts,  $\frac{3}{8}$  in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

**Old Material.**—The market is apparently quieter than at any time in several months. Mills are not buying and there are very few transactions between dealers. Prices are weak but several quotations are nominal owing to the absence of sales. A local consumer is offering \$8.50 for heavy steel yard scrap and \$9 for shop steel. In the Valley \$10 appears to be the maximum price. Some heavy steel scrap sold recently by the Erie Railroad Company is understood to have gone as low as \$9.80 for Sharon delivery. Quotations on old carwheels and malleable have declined 50c. a ton. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Old steel rails, rerolling.....	\$11.00 to \$11.75
Old iron rails.....	12.00
Steel car axles.....	11.75 to 12.00
Heavy melting steel.....	8.50 to 9.25
Old carwheels.....	10.00 to 10.50
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable.....	8.00 to 8.50
Railroad malleable.....	9.00 to 9.25
Light bundled sheet scrap.....	7.50 to 8.00
Per Net Ton	
Iron car axles.....	\$16.75 to \$17.00
Cast borings.....	5.50 to 5.75
Iron and steel turnings and drillings.....	5.00 to 5.25
Steel axle turnings.....	6.00 to 6.25
No. 1 busheling, new.....	8.00 to 8.25
No. 1 busheling, old.....	7.75 to 8.00
No. 1 railroad wrought.....	9.00 to 9.50
No. 1 cast.....	9.25 to 9.75
Stove plate.....	7.50

## Birmingham

BIRMINGHAM, ALA., November 16, 1914.

**Pig Iron.**—A few more sales were made the past week than for some time previous. No one claims to have secured more than \$10, even for first half, but it is denied that this price has been shaded. One lot of 1000 tons was booked for the Northwest and several lots of 200 to 300 tons were sold in the Middle West, besides small amounts in Southern territory. With three more blast furnaces off the active list it is believed stock accumulation will now cease. Two interesting events of the week were the departure of the first ship of the new Mobile-San Francisco line from Mobile, with several thousand tons of Birmingham iron and steel products aboard, together with the announcement of another sailing on December 2, and the opening of the Warrior River from a point 25 miles above Tuscaloosa to the gulf at Mobile for all the year traffic henceforth for vessels drawing 6 ft. of water. With the completion of lock 17 in May next this depth of navigation will have reached the Pratt coal seam as far north as Cordova, 75 miles north of Tuscaloosa, thus completing the Warrior improvement scheme begun 35 years ago and entailing a total cost of \$11,000,000. Vessels are moving out of Southern ports for European waters with greater freedom since more definite knowledge was secured of the position of German cruisers. The general feeling in the iron and steel trades has become more optimistic. Inquiries for 1915 delivery are on the increase. Large tonnages might possibly be secured under \$10, but no such sales are reported. Iron and coal men are equally interested in preventing increases in freight rates petitioned by Alabama railroads and iron men are fighting the retention of the old rate of \$2.75 on pig iron to Mobile which was ordered to be lowered to \$1.75, but is held up to \$2.75 on a request for rehearing by the railroads. The making of the Birmingham Southern, an adjunct of the Tennessee Company, a common carrier was received with favor by Alabama coal and iron operators. Extensions of that line to the Warrior River, connecting with the coal fields, are presaged. We quote, per gross ton, f.o.b. Birmingham furnaces, the higher figures representing special iron, as follows:

No. 1 foundry and soft.....	\$10.50 to \$10.75
No. 2 foundry and soft.....	10.00 to 10.25
No. 3 foundry.....	9.50 to 9.75
No. 4 foundry.....	9.25 to 9.50
Gray forge.....	9.00 to 9.25
Basic.....	10.00 to 10.25
Charcoal.....	23.50 to 24.00

**Cast-Iron Pipe.**—Some satisfactory orders have been received by local shops. The National, the newest pipe industry, has secured a Havana contract of about 1000 tons and one for Duluth for 300 tons. The leading interest is credited with an order for 1000 tons for the Bessemer plant. Operations at water-pipe plants are not over 75 per cent. The pipe shop of the Central Foundry Company at Holt is reported as operating busily on universal pipe. The sanitary shops have increased operations, but even at this are below normal in that respect. About 700 tons or so of water and sanitary pipe formed a portion of the shipment from Mobile to San Francisco during the week. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$20; 6-in. and upward, \$18, with \$1 added for gas pipe. Quotations are shaded on attractive specifications.

**Old Material.**—Dealers report unusually dull conditions still prevailing. Light cast and stove plate move in reasonable quantities, but other materials are very slow. We quote, nominally, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles.....	\$13.00 to \$13.50
Old steel axles.....	12.50 to 13.00
Old iron rails.....	12.00 to 12.50
No. 1 railroad wrought.....	8.50 to 9.00
No. 2 railroad wrought.....	7.50 to 8.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery cast.....	9.50 to 10.00
No. 1 steel scrap.....	8.00 to 8.50
Tram carwheels.....	8.50 to 9.00
Stove plate.....	8.00 to 8.50

**Coal and Coke.**—Coal operators do not report much improvement in the use of steam coal. The bunker busi-

ness is picking up, owing to the increase of vessels putting out of gulf ports. The domestic mines are hampered by a continuance of mild weather. Coke is not active, but the small supply is taken care of. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.75 to \$2.90; foundry, \$3 to \$3.20.

The Tennessee Coal, Iron & Railroad Company has ordered the resumption of operations at the Ensley, Ala., rail mill on double turn for one week, starting Monday, November 23. Further operations on this scale will depend on orders received meanwhile.

## St. Louis

ST. LOUIS, MO., November 16, 1914.

**Pig Iron.**—Increased inquiry from the foundry interests, together with reported purchases for a large Granite City plant, helped to give life to the market. The Granite City purchase is reported as 15,000 tons, of which one-third goes to that plant and the remainder to other plants of the same company. Sales were chiefly for carloads, except for 1200 tons, which included Lake Superior iron, Southern coke and Southern charcoal carwheel iron. A sale of 500 tons of No. 2 Southern was made for first half at \$10, Birmingham. Another sale was 300 tons of Lake Superior charcoal. Two other inquiries of 1200 and 1000 tons respectively remain unfilled to date.

**Coke.**—Practically no business has appeared in the coke market, but allotments under contract are moving without request for holding back. By-product coke is quoted a little under the Connellsville oven price plus \$2.80 freight rate, exact figures depending upon conditions at the moment of the transaction.

**Finished Iron and Steel.**—Structural material has been particularly dull. In the wagon trade demand has been cut to the minimum, while the agricultural demand is also light. Movement out of warehouse has shown considerable increase and there is evidence that fabricators are disposed to pay the advanced price for a time rather than commit themselves to large quantities and long time contracts. The quotations for stock out of warehouse are as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, 2.55c.; No. 28 galvanized, black sheet gauge, 3.55c.

**Old Material.**—About the only material selling is cast scrap of foundry grade. Aside from this the buying by dealers is for investment to await the turn in the market. Some parts of recent lists offered were withheld because of the very low prices bid. Dealers, while not particularly optimistic, believe that the bottom has been reached, but cannot figure when the upward movement will begin. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails.....	\$10.50 to \$11.00
Old steel rails, rerolling.....	9.50 to 10.00
Old steel rails, less than 3 ft.....	9.00 to 9.50
Relaying rails, standard section, subject to inspection.....	21.00 to 23.00
Old carwheels.....	10.50 to 10.75
No. 1 railroad heavy melting steel scrap.....	8.25 to 8.50
Shoveling steel.....	7.50 to 8.00
Frogs, switches and guards cut apart.....	8.50 to 9.00
Bundled sheet scrap.....	4.25 to 4.50
Per Net Ton	
Iron angle bars.....	\$9.50 to \$10.00
Steel angle bars.....	8.00 to 8.25
Iron car axles.....	15.00 to 15.25
Steel car axles.....	10.00 to 10.25
Wrought arch bars and transoms.....	10.00 to 10.25
No. 1 railroad wrought.....	7.50 to 7.75
No. 2 railroad wrought.....	7.00 to 7.25
Railroad springs.....	8.00 to 8.25
Steel couplers and knuckles.....	8.00 to 8.25
Locomotive tires, 42 in. and over, smooth.....	8.25 to 8.75
No. 1 dealers' forge.....	7.00 to 7.25
Mixed borings.....	3.50 to 3.75
No. 1 busheling.....	6.75 to 7.00
No. 1 boilers, cut to sheets and rings.....	5.25 to 5.75
No. 1 cast scrap.....	9.00 to 9.50
Stove plate and light cast scrap.....	7.75 to 8.25
Railroad malleable.....	6.50 to 6.75
Agricultural malleable.....	6.25 to 6.50
Pipes and flues.....	5.00 to 5.50
Railroad sheet and tank scrap.....	5.00 to 5.25
Railroad grate bars.....	6.25 to 6.50
Machine shop turnings.....	4.25 to 4.50

## San Francisco

SAN FRANCISCO, CAL., November 10, 1914.

Business continues light. The small jobbing movement is moderately well maintained, but the more important buyers are keeping out of the market, and the tonnage going to the mills is extremely small. Moreover, prices show even less stability than before. There is a feeling in some quarters that conditions are at their worst, and that a firmer feeling may develop early in the coming year. An upward movement would doubtless involve considerable replenishing of stocks. A considerable tonnage of barb wire has passed through here en route to Japan, and a fair movement of wire fence material is reported locally.

**Bars.**—Current business is almost entirely of a small jobbing nature. Some of the leading merchants have enough foreign bars still due to arrive to carry them into next year. Local mills continue to operate in a very small way, and inquiries for reinforcing material are subject to close competition. Values show some irregularity. Eastern mill agents quote on a basis of 1.15c., Pittsburgh, but a lower figure could probably be obtained on desirable specifications.

**Structural Material.**—No fabricating contracts worth mentioning have been closed for some time, but local shops report a few small jobs, and are doing more figuring than for several weeks. The various municipal projects previously reported are not yet definitely in the market, but a general contract has been let for the local waterfront postoffice, requiring about 150 tons, and plans will soon be out for a postoffice at Portland, Ore. Plans are also about ready for an addition to Lane Hospital. Plain material is quoted at 1.10 to 1.15c., Pittsburgh, or 1.75c. in carloads for prompt shipment from store, San Francisco.

**Plates.**—While merchants are doing a little desultory buying to keep their stocks sorted up, even the current jobbing trade is rather quiet.

**Sheets.**—The country demand for corrugated galvanized sheets has held up rather above expectations, and several jobbers have been compelled to replenish their stocks. Orders sent to the mills, however, are individually small. The possibility of a lower rail freight rate is having a deterrent effect in this line. Blue annealed sheets receive little attention. Prices are easy, quotations as low as 2.85c., Pittsburgh, being made on galvanized in some quarters.

**Standard Pipe.**—The pipe trade is as dull as ever. Jobbing business is irregular, and merchants are buying practically nothing.

**Cast-Iron Pipe.**—Business so far this month has been dull, recent inquiries having produced no result. Prices are quoted at \$31 per net ton for 4 in.; \$29 for 6 in. and up, with \$1 extra for gas pipe.

**Pig Iron.**—The report of a good-sized shipment of Southern iron to come by the Panama-Canal has occasioned some surprise locally, as this market is now quite liberally supplied with foreign iron. Foundry operations are closely restricted, and most buyers are taking little interest in offerings, either on the spot or for forward shipment. Buying is for the most part of a hand-to-mouth nature, the larger melters having good-sized stocks on hand, and prices are irregular.

**Coke.**—Shipments continue to arrive by sailing vessel, and the market is well supplied. Some rather large purchases are said to have been made by smelters, but on the whole requirements are light. Foundries are buying only in a small way. German Syndicate coke, for prompt delivery at the foundries, is quoted at \$15 per gross ton.

**Old Material.**—The scrap market in general is rather demoralized, with but little demand and growing accumulations, and prices are irregular. Cast-iron scrap might be had for cash as low as \$14 per net ton, though somewhat higher prices are commonly asked. There is practically no demand here for wrought scrap at present. While some steel melting scrap is moving on old contracts, there is hardly enough new business to establish a basis of values.

The largest exhibit so far received on the grounds of the Panama-Pacific Exposition is that of the United States Steel Products Company, which will occupy three-quarters of an acre in the Palace of Mines and Metallurgy, where the work of installation has begun. The exhibit consists largely of models of mills, showing modern lighting and hygienic conditions.

A. B. Ambler, Sheldon Building, San Francisco, has taken the Pacific coast agency for the Alan Wood Iron & Steel Company, Philadelphia, Pa.

A. A. Miller, Northwest representative of the American Cast Iron Pipe Company and the Hersey Meter Company, has opened an office at 432 Railway Exchange, Portland, Ore., and will shortly open an office at Seattle, Wash.

## New York

NEW YORK, November 18, 1914.

**Pig Iron.**—Buying of the past ten days in districts supplied by Buffalo and eastern Pennsylvania furnaces has amounted to considerably more than would be inferred from the tonnages for which inquiries were sent generally to the trade. There has been a good deal of quiet buying. It is understood that a number of large interests have bought without negotiating with more than one seller in each case. The total therefore cannot be estimated. Several important consumers in New York State and New England found quotations attractive enough to cover for the first half of 1915. A good many smaller foundries have taken on iron also, but most of the latter confined their purchases to the first quarter. An interest at Troy is credited with buying 15,000 tons of forge iron at Buffalo. Two furnace companies there have sold freely at \$12 at furnace for No. 2 X, and the fact that this price was also available where only small lots were inquired for seems to bear out the statement that it was shaded a trifle in some of the largest buying. A 3000-ton inquiry has been put out by a Newark foundry, and a soil pipe interest is inquiring for an equal amount for a New York State plant. An eastern Pennsylvania producer is believed to have shared in some of the larger business lately closed. Virginia furnaces have not met some of the low prices named in the sales of the past fortnight, their minimum as a rule being \$12.75 at furnace for No. 2 X, with delivery in most cases limited to the first quarter. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.25 to \$14.75; No. 2 X, \$14 to \$14.25; No. 2 plain, \$13.75 to \$14. Southern iron is quoted at \$14.50 to \$14.75 for No. 1 and \$14.25 to \$14.50 for No. 2.

**Ferrolloys.**—The recent British embargo on ferromanganese has not yet caused any great anxiety on the part of consumers here. They are apparently well supplied for some time especially in view of the reduced operation of steel plants. Representatives here of British producers state that they have no advices as to when shipments can be resumed nor as to any definite arrangements to bring this about. It is expected, however, that the assurances being given by agents here that the alloy will be for domestic consumption only and that any other reasonable request, such as the giving of a bond, will be complied with, will in time open the way for a resumption of shipments. Quotations are only nominal at \$68, seaboard. Offerings at \$75 to \$85 are heard of, but no definite sales. Ferrosilicon, 50 per cent., is still quoted at \$71 to \$73, Pittsburgh, with little activity.

**Finished Iron and Steel.**—Opinion generally is that no marked improvement will be experienced before the first of the year, and more likely not before February, 1915. Inquiry in most lines remains active, but the total amounts involved are small. Improvement is expected first in a stiffening of prices, which now represent more 1.10c. Pittsburgh basis business than was the case a week ago. The bulk of the business is, however, still going at 1.15c. Export inquiries are as vague as ever, even commissions here to make purchases having few of the particulars necessary to make intelligent quotations. No railroad cars for foreign use have yet materialized, and there has been a cessation in demand for barb wire. It follows that some



of the export transactions are kept as quiet as possible, like one round order for steel bars for shrapnel shells. Those dependent largely on railroads find November so far decidedly duller than October and the condition in the structural market is exceedingly quiet except for the steady run of small orders. The larger transactions of the week include 1200 tons for the Ruppert brewery stock house, to the George A. Just Company; 800 tons for the Levy apartment house, Park avenue, and 1100 tons for the Evander-Childs high school, both to the Hinkle Iron Company; 300 tons for six bridges for the Pennsylvania, near Johnstown, reported placed with the Cambria Steel Company; 2000 tons of reinforcing bars bought by the Turner Construction Company; 300 tons for caisson locks for the Flinn-O'Rourke Company, placed with the Coatesville Boiler Works; 300 tons for Wellesley College to Levgar Structural Company; 21 sleeping cars for the Northern Pacific which have been or are about to be awarded to the Pullman Company, leaving 74 passenger equipment cars yet in the market for that railroad, and 200 underframes for the Pere Marquette to be built by the Pressed Steel Car Company. The Boston & Albany has entered the market for 200 tons of bridge work in Boston and bids have been asked for some 500 tons for replacing a burned pier of the New York Dry Dock Company, Brooklyn. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, and iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

**Cast-Iron Pipe.**—Two important pipe lettings are announced for the coming week. The Metropolitan Water and Sewerage Board, Boston, Mass., will open bids November 23 for 4000 tons of 60-in. and the city of Detroit, November 24, on 25,000 tons of all sizes from 6 to 48 in. The latter is by far the largest tonnage coming on the market for a long time. The contract for 1400 tons of 30-in. has been awarded by the city of Troy, N. Y., to the Standard Cast Iron Pipe & Foundry Company. Private buyers are inquiring somewhat more freely for prices for spring delivery. Carload lots of 6-in. are still quoted at \$20 to \$20.50 per net ton, tidewater.

**Old Material.**—The situation has not been relieved by any improvement in inquiries or sales. The market appears to be fully as stagnant as in the recent past. Nevertheless, the more hopeful feeling noted last week continues, and an early buying movement is quite confidently expected. Dealers' quotations are as follows, per gross ton, New York:

Old girder and T-rails for melting..	\$7.00 to	\$7.25
Heavy melting steel scrap.....	7.00 to	7.25
Relaying rails .....	19.00 to	19.50
Rerolling rails .....	8.00 to	8.25
Iron car axles .....	14.00 to	14.25
Steel car axles .....	10.00 to	10.50
No. 1 railroad wrought .....	8.50 to	9.00
Wrought-iron track scrap.....	8.00 to	8.50
No. 1 yard wrought, long.....	8.00 to	8.50
No. 1 yard wrought, short.....	7.00 to	7.25
Light iron .....	3.00 to	3.50
Cast borings .....	5.50 to	6.00
Wrought turnings .....	5.00 to	5.50
Wrought pipe .....	7.00 to	7.25
Carwheels .....	8.50 to	9.00
No. 1 heavy cast, broken up.....	9.50 to	10.00
Stove plate .....	7.25 to	7.50
Locomotive grate bars .....	6.00 to	6.50
Malleable cast .....	6.50 to	7.00

## Boston

BOSTON, MASS., November 17, 1914.

**Old Material.**—The dealers in scrap talk optimistically. Their local business with the iron foundries continues better. Their Pennsylvania business, however, has not improved, yet they express confidence that the low point has been passed and that from now on an increase in sales will come, though probably gradually. Prices have not been altered. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel .....	\$7.00 to	\$7.75
Low phosphorus steel .....	13.75 to	14.75
Old steel axles .....	12.75 to	13.25
Old iron axles .....	20.25 to	20.75
Mixed shafting .....	12.00 to	12.25
No. 1 wrought and soft steel.....	8.25 to	8.75
Skeleton (bundled) .....	5.50 to	5.75
Wrought-iron pipe .....	7.00 to	7.50
Cotton ties (bundled) .....	5.25 to	5.75
No. 2 light .....	3.25 to	3.75
Wrought turnings .....	5.00 to	5.50
Cast borings .....	5.00 to	5.25
Machinery cast .....	10.75 to	11.00
Malleable .....	7.50 to	7.75
Stove plate .....	7.00 to	7.50
Grate bars .....	5.25 to	5.50

## Heavy British Iron Purchase

### Vessel Scarcity Causes Higher Freight Rates— Tin-Plate Exports Banned to Some Countries

(By Cable)

LONDON, ENGLAND, November 18, 1914.

The pig-iron position is unaltered as regards foundry grades, but hematite looks better, largely owing to the enormous rise in freight rates. Great scarcity of vessels now prevails, due to Government chartering, and orders are being placed for new ships. More business is being done in hematite pig iron; one Sheffield consumer has bought 100,000 tons for next year's delivery. The number of furnaces in blast in the three leading districts is 166, against 184 at the corresponding time last year. Stocks of pig iron in Connal's stores are 103,782 tons, against 104,167 tons last week. The navigation of the River Forth has been closed by the Government to protect Rosyth, and this may restrict shipments of Cleveland foundry pig iron to Scotland. Ferromanganese exports are still prohibited, though possibly permits may be issued against satisfactory guarantees. Tin plates are firmer in consequence of the higher price of tin. Exports of tin plates have been forbidden to Denmark, Holland and Sweden, owing to the suspicion that these neutrals are supplying Germany. Semi-finished steel is quiet and business in finished steel products is slack. Quotations on ferromanganese are nominal. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 9d. (\$3.10), against 12s. 7½d. (\$3.07) last week.

Cleveland pig-iron warrants (Tuesday), 49s. 6d. (\$12.04), against 49s. 2d. (\$11.96) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 50s. (\$12.17), against 49s. 9d. (\$12.10) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 10s. (\$41.36), against £8 15s. (\$42.58) last week.

Steel ship plates, Scotch, delivered local yards, £6 15s. (\$32.84).

Steel rails, export, f.o.b. works port, £6 2s. 6d. (\$29.80).

Hematite pig iron, f.o.b. Tees, 62s. 6d. (\$15.21), against 61s. 9d. (\$15.03), last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. (\$23.12).

Steel joists, 15 in., export f.o.b. Hull or Grimsby, £6 2s. 6d. (\$29.80), against £6 7s. 6d. (\$31.02) last week.

Steel bars, export, f.o.b. Clyde, £6 15s. (\$32.84), against £7 (\$34.06) last week.

### Pig-Iron Production Severely Cut—Welsh Bars Reduced—Sales From the United States Small

(By Mail)

LONDON, November 6, 1914.

The pig-iron position does not alter much, and the present tendency, although moderately steady, does not seem to point to much improvement. The output has been most severely cut into, but even so it is ample for all needs. Producers complain that they are unable to make ends meet. On the face of it 50s. (\$12.17) a ton for Cleveland ought to be a decent price enough for foundry iron, but dear ore and expensive fuel have had to be reckoned with, and for that matter have still to be taken into account. It is interesting in this connection to see that the average price of No. 3 Cleve-

land iron in 1913 was 58s. 6½d. (\$14.25); in 1912, 58s. 1d. (\$14.14); in 1911, 47s. 5d. (\$11.53); in 1910, 50s. 1d. (\$12.19), and in 1909, 49s. 3d. (\$11.98). Since 1899 the average annual price has seven times been below 50s. (\$12.17) and twice only a fraction above it. The highest average price in this period was 68s. 9d. (\$16.73) in 1900, and the next highest record was 58s. 6d. (\$14.30) last year. The average for the 14 years was 51s. 8d. (\$12.57). Based therefore upon the average over a fairly long period, present rates are a little too low.

In semi-finished steel, Welsh bars have at last been officially reduced to 95s. (\$23.12) locally. This is a fall of 7s. 6d. (\$1.82) from the official price as quoted for some time, but it has been possible to buy at 100s. (\$24.33) if not less from certain directions. More or less vague reports come over here from your side as to alleged large sales of sheet bars and billets, but I cannot trace any of the business. A few little lots have been sold to Glasgow, but the entire tonnage is of no account. Wire rods have been sold also to Liverpool and Manchester, but here again no formidable amount is involved.

## Metal Market

NEW YORK, November 18, 1914.

### The Week's Prices

Cents Per Pound for Early Delivery

Copper, New York		Tin, New York		Lead		Spelter	
Nov.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
11	11.50	11.25	33.87½	3.50	3.40	5.00	4.85
12	11.50	11.37½	33.75	3.60	3.50	5.00	4.85
13	11.50	11.50	33.50	3.60	3.52½	5.00	4.85
14	11.75	11.62½	33.00	3.60	3.52½	5.05	4.90
15	11.75	11.75	33.00	3.60	3.52½	5.10	4.95
17	12.00	11.87½	32.50	3.70	3.62½	5.10	4.95

Copper has advanced steadily under a heavy demand. Tin is quiet and lower. Lead has been advanced twice in the week. Spelter is firm at higher prices. The quotations for antimony are maintained.

### New York

**Copper.**—A good, steady business in which the buying ran into the millions of pounds caused electrolytic to advance ½c. almost every day until yesterday when the quotation was 12c., 30 days, delivered, or 11.87½c., cash, New York. Lake shared in the good movement also and its quotation yesterday was 12c., cash, New York. Sellers are feeling cheerful in view of the fact that the buying was to fill actual consumptive needs and devoid of speculation except, perhaps, on the part of consumers who, because of the low prices which prevailed last week, may have taken more than they otherwise would. At the same time it is known that their stocks were very low and the movement is considered to be based on a solid foundation. It is believed that the healthy condition will last, providing the curtailment of production continues. One estimate of the amount of copper purchased in the last few days, and one which in some quarters is believed to be conservative, fixes the quantity at 50,000,000 lb. It is no secret that a few individual transactions ran into millions of pounds. Inasmuch as exports are not being announced, there is no definite indication of the extent to which Europe figured in the buying, although 25 per cent. is given as a guess. A representative of a very large London house was in New York last week and is reported to have placed substantial orders at prevailing prices. European stocks are dwindling rapidly.

**Tin.**—Since the last report the market has been dull and the indifference of consumers with a desire to sell manifested almost daily by dealers caused quotations to decline until yesterday the price asked was 32.50c. The anxiety of consumers appears to have ceased when the German cruiser Emden was destroyed, as with that menace removed from the Indian Ocean, they see no reason why there should not be a steady stream of supplies from the Far East. At the same time it is recognized that any good buying activity would cause the market to advance rapidly. Arrivals this month total 1035 tons while there is afloat 2225 tons. On the steamer Marquette, due November 25 from London, is 830 tons.

**Lead.**—Twice in the week the leading interest advanced its quotation \$2 per ton, making the present price 3.70c., New York. There has been a fair demand and the majority of independent sellers have had such confidence in the situation that their quotation has been higher than that of the leading producer, as a result of which the latter interest has been getting most of the business and continued to do so despite its advances. Exports have undoubtedly been good though they cannot be given, as the Government is reserving the figures. Sellers are unwilling to contract for delivery beyond December, partly because of an expectation that freight rates will be advanced at an early date. The St. Louis quotation is 3.62½c.

**Spelter.**—This metal was bought on November 16 at 5.10c., New York, equal to 4.95c., St. Louis, and there has been no change since that day. Up to that time the market gathered strength. There is understood to be a good export demand and a realization of this caused domestic consumers to get in the market and with their activity prices advanced.

**Antimony.**—Domestic consumers have done little buying but prices are maintained by continued reports of foreign requirements. There has not been much metal sold on domestic account for some time, but home consumers must soon replenish their stocks. Quotations are practically unchanged at 17c. to 18c. for Cookson's, 15c. to 16c. for Hallett's and 13½c. to 14½c. for Chinese.

**Old Metals.**—The market is more settled and the decline has been halted for the time being. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	11.00 to 11.25
Copper, heavy and wire	10.75 to 11.00
Copper, light and bottoms	9.75 to 10.00
Brass, heavy	8.25 to 8.50
Brass, light	6.25 to 6.50
Heavy machine composition	10.50 to 10.75
Clean brass turnings	7.50 to 7.75
Composition turnings	9.25 to 9.50
Lead, heavy	3.25
Lead, tea	3.00
Zinc scrap	3.50

### Chicago

NOVEMBER 16.—Freer buying has accompanied the easing up of the money situation, and a general recovery is noted in the prices of most metals. Values have been at such low levels that but slight encouragement is needed to bring advances. We have revised our quotations as follows: Casting copper, 12c.; Lake copper, 12.25c., for prompt shipment; small lots, ½c. to ¾c. higher; pig tin, carloads, 34c.; small lots, 37c.; lead, desilverized, 3.55c., and corroding, 3.80c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.05c.; Cookson's antimony, 20c. for cask lots; other grades, 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10c.; copper bottoms, 8.50c.; copper clips, 9.50c.; red brass, 9c.; yellow brass, 6.50c.; lead pipe, 2.90c.; zinc, 3.50c.; pewter, No. 1, 24c.; tinfoil, 27c.; block tin pipe, 27c.

### St. Louis

NOVEMBER 16.—Non-ferrous metals have been firm, with some slight advances and a fair amount of business. Lead is quotable at 3.50c.; spelter, 4.90c.; tin, 36c.; Lake copper, 13c.; electrolytic copper, 12.90c.; Cookson's antimony, 16c. In the Joplin zinc ore market prices were firm at \$40 to \$44 per ton for 60 per cent. and top settlements \$47. Calamine was firm at \$19 to \$21 for 40 per cent. and top settlement \$27. Lead ore, 80 per cent. was firm at \$42. Miscellaneous scrap metals are quoted as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3c.; pewter, 20c.; tinfoil, 24c.; tea lead, 3c.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., has received orders for 20,000 tons of steel rails for January delivery.

Some additions have been made recently to the electric furnace plant of Electro-Metals, Ltd., at Welland, Ont.

S. DIESCHER & SONS.

Mechanical and Civil Engineers,

PITTSBURGH PA.

## Iron and Industrial Stocks

NEW YORK, November 18, 1914.

The past week's progress toward normal financial conditions is declared to have been greater than in any like period since the outbreak of the European war. Exchange on Great Britain fell below the gold export point and a sharp decline took place in rates for money. Restrictions were removed on dealings in State and municipal bonds and higher prices were realized for all classes of securities wherever dealt in. The new Federal reserve banks were opened on Monday and are now regularly transacting business. Expectation is strong that the New York Stock Exchange may be opened at an earlier date than recently seemed possible. Meanwhile, however, there are no authoritative quotations on iron and industrial stocks.

### Dividends

The Moline Plow Company, regular quarterly, 1% per cent. on the first preferred stock, payable December 1.

The Canadian Car & Foundry Company has officially deferred action on the quarterly dividend on its preferred stock. The company made its last quarterly payment on the preferred stock July 25. The October 25 dividend was not paid, and action is now deferred on the dividend payable January 25.

The Underwood Typewriter Company regular quarterly, 1% per cent. on the preferred stock and 1 per cent. on the common stock, both payable January 2.

The Harbison-Walker Refractories Company, regular quarterly, 1/2 of 1 per cent. on the common stock, payable December 1.

## OBITUARY

OLIVER WILLIAM GREENSLADE, president Greenslade Foundry Company, Milwaukee, Wis., died November 12, from heart failure, aged 55 years. He was born in Milwaukee and entered the employ of his father in the firm of Bailey & Greenslade in 1874. In 1881 he established the foundry firm of Greenslade Brothers in company with his brother Alexander, who died a short time afterward. In 1892 the firm was incorporated under the present style.

JOSEPH W. JACOB, vice-president of the Charter Oak Stove Company, St. Louis, died November 10 after a brief illness, aged 53 years. He was born in Circleville, Ohio. Removing to St. Louis, he was for a time traffic agent for the Baltimore & Ohio Railroad. About 20 years ago he became connected with the Charter Oak Stove Company.

WILLIAM M. VAN NORTWICK, Batavia, Ill., long prominent in the manufacture of paper and agricultural implements, died November 14, aged 78 years. He leaves his widow and a son.

URIAH HILL, JR., Peekskill, N. Y., died November 14, aged 97 years. He had long been identified with stove manufacturing interests. He entered the sales department of the Finch Foundries in 1842, and in 1855 he became a partner. In 1867 the Union Stove Works was formed and incorporated. He became president, and remained so until a few years ago, when he retired and was succeeded by his son, Edward Finch Hill.

CLARENCE WILLIAMSON, until about two years ago assistant treasurer for Joseph T. Ryerson & Son, with whom he had been connected for 25 years, died suddenly November 11 at Vincennes, Ind., while on an automobile trip. He gave up his work in February, 1913, because of impaired health and sought recovery on a farm.

The Standard Steel Construction Company, Ltd., steel buildings and bridges, Welland, Canada, desires it known that it has no connection with the Standard Structural Steel Company, Buffalo, N. Y., which recently filed a petition in bankruptcy.

## PERSONAL

Erskine Ramsay, vice-president and chief engineer of the Pratt Consolidated Coal Company, who was active on the local committee at the October meeting of the American Iron and Steel Institute at Birmingham, Ala., was seriously injured at the launching of the first coal barge of his company near Tuscaloosa, Ala. He is reported to be making a good recovery.

Walter F. Prince, for some years general superintendent of the foundry department of the Henry R. Worthington Company, Harrison, N. J., has recently opened an office at 30 Church street, New York, as a consulting mechanical engineer in foundry work.

At the recent annual meeting of the board of directors of the American Rolling Mill Company, Middletown, Ohio, George H. Charls, formerly assistant secretary and manager of sales, was elected vice-president and manager of sales. Mr. Charls has been connected with the company over 12 years, and his experience has been gained through service in almost every department from the shops to his present position.

C. H. Johnson, director and European sales manager of the Gisholt Machine Company, Madison, Wis., arrived in New York November 11.

George S. Atwood, secretary of the American Association of Commerce and Trade, Berlin, Germany, arrived in New York November 11, having left Berlin October 30. He has come to this country in connection with the business of his organization and more particularly to obtain official information looking to better trade relations, both present and future, between this country and Germany. After business trips to Charleston and Nashville, Mr. Atwood will visit Washington where he will confer with officials of the United States Government and of the Chamber of Commerce of the United States. He is especially interested in the transportation of mail matter and freight to and from this country and Germany. Second-class matter is being received in Germany much more promptly than letters. A great deal of freight in Germany is awaiting means of shipment to the United States. He also wishes to obtain from the State Department the latest ruling as to what constitutes contraband of war.

Floyd F. Woods has been appointed sales manager for the Epping-Carpenter Pump Company, Pittsburgh, Pa. He takes the place of R. Bowen, who is no longer connected with the company.

John H. Hall will speak on "Manganese Steel" and George F. Comstock on "Titanium and Its Effects on Steel" at a meeting of the New York Section of the Society of Chemical Industry at Rumford Hall, 50 East Forty-first street, New York, Friday evening, November 20.

D. Eppelsheimer, chief engineer of the American Rolling Mill Company, Middletown, Ohio, returned this week from a trip to England.

A. A. Ambler, for the past three years manufacturing superintendent with the American Rolling Mill Company, has joined the C. C. Fouts Company, Middletown, Ohio.

Following the Birmingham meeting of the American Iron and Steel Institute, President Farrell of the Steel Corporation spent 10 days in the South—New Orleans, Memphis and other cities being included in his itinerary.

P. L. Frailey, for several years in charge of the advertising department of the Brier Hill Steel Company, Youngstown, Ohio, has resigned, effective December 1. He has purchased the business of the Cleveland Auto Supply Company, which he will transfer from Cleveland to Youngstown.

Harry A. Pike has been elected a member of the board of directors and president of the Clifton Porcelain Tile Company, Newark, N. J. He succeeds M. Tscherner, resigned, as president. Mr. Tscherner remains as director. Mr. Pike was formerly general Eastern representative of the American Vanadium Company and Flannery Bolt Company, Pittsburgh.



## FOR A SEABOARD TIN SMELTER

### Status of the Plan to Bring Bolivian Concentrates to This Country

BY CHARLES M. PEPPER

Prospects for smelting Bolivian tin in the United States seem to be improving. None of the propositions of the rival groups of promoters has yet come to a head, but the conclusion seems to have been reached by responsible capitalists that the project is feasible.

About the permanent character of the Bolivian tin deposits no query need now be raised. The Geological Survey of the United States is satisfied on that point. Ten years ago I was in Bolivia when the output was less than 10,000 tons, and there were many experts who declared that the veins were merely superficial and that the lodes would soon be exhausted. Instead, Bolivian production has gone on increasing until it now exceeds 25,000 metric tons of metallic tin annually, and there are known deposits which will be worked as transportation facilities are provided. The Oruro district, from which the bulk of the tin now comes, is fairly well provided with transportation facilities, while those for the Huayana-Potosi are also improved. The consequence is that both regions are producing more largely than ever before. The extension of the railroad south from Uyuni to Tupiza, near the Argentine border, will also insure the opening of the tin deposits of the district of Chorolque and Cotagaita.

The quality of the Bolivian tin is not equal to that of the Malay Straits, but it is not greatly inferior. The "barilla" or concentrates yield an average of 60 per cent. of metallic tin. This is the basis on which the Bolivian Government levies the export tax.

#### WHY NO SMELTER IN BOLIVIA

The inability of Bolivia to smelt her own tin, as has been frequently explained, is due to the lack of fuel. A ton of coal delivered at Oruro, which is 650 miles from the seacoast, costs \$45. That explains why only 400 or 500 tons of tin bars are exported, as against 40,000 tons of concentrates.

Until the European war broke out, above 93 per cent. of Bolivian tin concentrates was shipped direct to England by way of the Straits of Magellan, or around Cape Horn. Most of the remainder went to Hamburg, although there were occasional shipments to Havre. With the European market interrupted and several thousand miners idle there would be the direct loss to the Government of the \$1,000,000 of revenue derived from the export tax. To Bolivia \$1,000,000 revenue from any source is a very important item.

#### THE UNITED STATES PROJECT

The Bolivian Government, through its diplomatic representative in the United States, and by means of direct cable communication from President Montes himself, undertook to interest American capitalists in the erection of smelters somewhere on the Atlantic coast. The capitalists approached, while favorably inclined, did not care to put up a smelter merely to take care of Bolivian tin during the war, and to have it shipped again to England when peace is restored. One plan which has been given considerable publicity was for the Bolivian Government itself to erect and operate a smelter in the United States. The Washington administration, when approached on that proposition, indicated in a general way that it would have no objection. Another proposition was for a partnership arrangement under which the Bolivian Government would get a percentage of the profits.

There seems to have been a misconception on the part of some of the promoters as to Bolivia's position. It seemed to be assumed that the tin mines were owned by the Government itself. This is not the case. The Government might guarantee that it would insure the smelters a sufficient supply of tin concentrate; but to do this it would itself have to buy the concentrates at the mines, just as it would have to do if a Government smelter were erected. The most recent suggestion from La Paz has been that the American capitalists send representatives to Bolivia to make contracts

with the producers. This indicates the limitations which the Government feels, but it is in fact a sensible business suggestion. Any smelter on the Atlantic coast will have to have contracts with the Bolivian mines before it can undertake operations. It happens that while there is a varied European ownership in the mines, the bulk of the producing ones are owned by Bolivians. The mines of Señor Simon Patiño, the Bolivian tin king, produce above 35 per cent. of all the tin of the country. Señor Patiño is very patriotic. He has put part of his own riches at the disposal of the Government in building railroads, and doubtless would co-operate in its plans for providing for the absorption of Bolivian tin by the United States.

#### BOLIVIA'S EXPORT TAX

Mindful of the experience with the Bayonne, N. J., tin smelter of some years ago, when the Malay Britishers induced the Government to lay an export tax on tin from the Straits Settlement to countries other than the British Empire, thus shutting off the supply, capitalists who have been approached in regard to the Bolivian project have made inquiry as to Bolivia's attitude on this subject. It may be said as a general proposition that Bolivia cannot afford to forego the export tax on tin. The situation, however, is not similar to that which existed in the Straits Settlement. The tax is already laid, and the only question would be as to an unexpected increase in it, which might interfere with the shipment of Bolivian concentrates. This would not be likely, because Bolivia cannot afford to limit the export of her most important product by taxing it too much. Instead, she is interested in enlarging the market for that product.

The bulk of the Bolivian tin concentrates are transported to the Pacific coast port of Antofagasta in Chile, over the Antofagasta & Bolivia Railway. Most of the 600 or 700 miles transport is down grade, but in fixing the freight rate the cost of hauling the cars up grade, not always with a full cargo of return merchandise, is counted. The latest report gave the rate from Oruro to Antofagasta as \$46 per ton.

#### TRANSPORTATION FACILITIES

The Panama Canal, on the side of water transportation, offers a direct inducement for a smelter on the Atlantic coast. Better ocean freights undoubtedly can be secured for cargoes coming up the west coast and through the Canal to some Atlantic port than to the British ports. There is the actual shortening of the route as between Colon and, say, a New York or a New Jersey port and Liverpool or Southampton. This enters materially into the economic equation by which the smelting of the Bolivian tin in the United States would save the proportion of extra ocean freight on the concentrates to English ports and the freight on the metallic tin from England to American ports.

An American smelter would have no difficulty in securing satisfactory contracts with existing steamship lines for the transportation of Bolivian tin. Preliminary inquiries have shown that several companies are ready to make contracts for a definite service for a long period at reasonable rates.

According to a recent report of the Department of Commerce, quoted by the Geological Survey, the United States in 1913 imported a fraction above 53,000 net tons of tin, valued at a little less than \$47,000,000. This was above 40 per cent. of the world's production.

The importation of the Bolivian concentrates and their smelting on the Atlantic coast so that a part of the metallic tin consumed by American industries would be obtainable in this country, would be an unquestioned advantage.

The London Times Engineering Supplement, in a report on the condition of trade in and about Birmingham, England, says: "The revision of the United States tariff has enabled local manufacturers to enter America with goods which previously were practically excluded, and the shipments from the Birmingham consular district to the United States during the last quarter showed a remarkable increase, amounting to £349,142 (\$1,699,099), or 27.8 per cent. more than in the corresponding period of last year."

# Latest Railroad Reports on Rail Failures

## Bessemer Rail Failures About Two and One Half Times Those of Open-Hearth—Wide Variations in Product of Different Mills

M. H. Wickhorst, engineer of tests for the rail committee of the American Railway Engineering Association, has made an exhaustive report on rail failures for the year ending October 31, 1913, and in it has included also statistics for preceding years beginning with 1908. The most noticeable thing about the figures given is the wide variation in the number of failures of rails from the different mills; namely, Algoma, Bethlehem, Cambria, Carnegie, Colorado, Dominion, Illinois, Lackawanna, Maryland, Pennsylvania and Tennessee.

The information furnished by the railroads reporting showed the number of tons laid of each year's rolling from each mill and the total number of failures that had occurred in each year's rolling from the date laid until October 31, 1913. Heretofore only the failures occurring in the year covered by the report were shown, but in this report the total failures occurring since the rail was laid are made the basis of comparison, which constitutes an important change from former reports. "The failures per year of service," the report says, "vary in different years in the life of the rail and are, of course, influenced by the density of traffic over the rail. The total or accumulated failures occurring during its life would therefore constitute a more definite basis of comparison than the failures during any one year, and would probably tend to equalize somewhat the differences caused by different densities of traffic in causing failures."

The failures were divided into four classes—head, web, base and broken. Under each class the number of failures for the various ingot positions was shown in some cases. The tonnages of rails represented by the statistics in the report are shown below:

Year rolled	Bessemer	Open-hearth	Total
1908.....	282,945	156,120	439,065
1909.....	432,155	461,261	893,416
1910.....	564,713	828,111	1,392,824
1911.....	276,933	646,809	923,742
1912.....	80,146	939,025	1,019,171
1913.....	63,472	793,557	857,209

It will be noticed that in 1908 the Bessemer rails exceeded the open-hearth rails, while in 1912 and 1913 the tonnage of Bessemer rails rolled was comparatively small. The failures were tabulated with particular reference to three things:

1. The performance of the rails made by the different mills.
2. The comparative performance of three sections: The A. R. A. type A or thick base high rail; the A. R. A. type B or thick base low rail, and the A. S. C. E. type or thin base rail.
3. The comparative performance of rails from different ingot positions.

A special value of the statistics is that in showing the performance of each mill from year to year the improvement in successive years or the contrary is indicated. The statistics have already been a strong incentive to the mills to strive to reduce the number of defective rails shipped. Lots of less than 1000 tons—that is, less than 1000 tons in any one year's rolling—were excluded from the tabulation.

Below are shown the failures of each year's rolling divided between Bessemer and open-hearth rails:

Year rolled	Failures per 10,000 tons		Comparative failures	
	Open-hearth	Bessemer	Open-hearth	Bessemer
1908....	268.9	302.1	100	112
1909....	109.0	212.4	100	195
1910....	57.6	132.1	100	229
1911....	37.4	94.2	100	252

The rails for 1912 and 1913 are not included in the above, being too young to permit of as reliable a comparison as for older rails. In 1908, it will be noted, the Bessemer failures were only a little greater than those of open-hearth rails, but they increased in the following years, being more than two and a half times the open-hearth failures in 1911.

### WIDE VARIATIONS IN MILLS

In the following table the rank of mills as regards failures of rails rolled by them is shown, names being omitted. Taking the average number of failures per 10,000 tons of all the mills in any year's rolling as 100 the relative number of failures of each mill is indicated for the period 1908 to 1911, inclusive:

Open-hearth		Bessemer	
Mill	Relative failures	Mill	Relative failures
A .....	20	E .....	56
B .....	26	H .....	71
C .....	52	C .....	89
D .....	58	G .....	89
E .....	76	F .....	161
F .....	96	J .....	191
G .....	107		
H .....	136	Average .....	100
I .....	210		
J .....	312		
K .....	539		
Average .....	100		

The report says: "The 100 given as 'average,' it should be understood, is not obtained as the average of the column below which it appears, but is taken to represent the failure performance of the tonnage covered by these statistics of all the mills during the four years represented and for Bessemer and open-hearth rails separately. The 'relative failures' gives the number of failures that occurred in the same tonnage that had 100 failures as an average of the rails of all the mills. A striking feature noticeable in this comparison is the very large differences between the different mills, especially in the open-hearth steel, some of which can be attributed, probably, to differences in the service to which the rails are subjected, but this can be only a partial explanation."

### B TYPE RAIL SHOWED MOST FAILURES

The diagrams accompanying the report show that in open-hearth rails the B type of section showed the highest number of failures per 10,000 tons in all the years. It is remarked, however, that this section probably had been selected for the heaviest service and hardest conditions and for this reason no definite conclusions can be drawn as to the different types of section. As between the A type and the thin base type one showed the lowest number of failures part of the time and the other the lowest number in other years.

The following table shows the distribution of the failures among the four classes—head, web, base

and broken. In general, the thin base sections have a somewhat larger proportion of failures classified as base breaks and broken rails.

*Failures According to Part of Rail—Average of Percentages for the Six Years*

Type of section	Bessemer			
	Head	Web	Base	Broken
ARA-"A" .....	36	5	6	53
ARA-"B" .....	53	6	15	26
ASCE .....	26	2	35	37
Average .....	39	4	19	38
Type of section	Open-hearth			
	Head	Web	Base	Broken
ARA-"A" .....	59	8	5	28
ARA-"B" .....	49	11	10	30
ASCE .....	33	9	12	46
Average .....	47	9	9	35

It is noticeable, however, in the open-hearth results that the A. R. A. type B sections, which have the heaviest base, show almost as high a percentage of base breaks as the thin base sections.

Some of the lots of rails were reported as having been treated with ferrotitanium. The figures below give the failures per 10,000 tons for each year's rolling for both plain and ferrotitanium treated rails.

Year rolled	Bessemer		Open-hearth	
	Plain	F-t	Plain	F-t
1909.....	292.1	64.4	....	....
1910.....	149.1	126.5	166.3	105.5
1911.....	73.6	273.1	43.8	58.7
1912.....	25.6	5.5	8.7	8.1

The plain steel in some cases showed a lower number of failures than the titanium-treated steel, but on the whole the treated steel seems to have had less failures than the plain.

The report contains 85 pages of tables in which details of results are given for rails rolled at each mill, the name of the mill being given in each case. Mr. Wickhorst's conclusions are given in a summary which is herewith reproduced:

### Summary

1. Statistics are given of rail failures collected for the year ending October 31, 1913, furnished by various railroads of the United States and Canada in response to a circular sent out by the American Railway Association. The information furnished by each railroad showed the number of tons laid of each year's rolling from each mill, and also showed the total number of failures that occurred in each year's rolling from the date laid until October 31, 1913.

2. The basis of comparison is the number of failures per 10,000 tons from the date laid until October 31, 1913.

3. The failures were divided into four classes, as head, web, base and broken. The ingot positions were divided into "A" rail, "B" rail and "lower" rails.

4. The failures were tabulated with particular reference to three things: First, the performance of the rails made by the different mills; second, the comparative performance of the three types of section, the A. R. A. type A, or thick base, high rail; the A. R. A. type B, or thick base, low rail, and the A. S. C. E. type, or thin-base rail; third, the comparative performance of rails from different ingot positions.

5. As an average of all the failures tabulated, the failures per 10,000 tons of Bessemer rails were a little more in the 1908 rolling than the failures of open-hearth rails. In succeeding years the relative number of Bessemer failures increased to about two and one-half times the number of open-hearth failures in the 1911 rolling.

6. The failure performance of the rails from the several mills are shown, and probably the most striking feature is the large differences between the different mills. A table is given showing the ranking, or order of rail breakage, of the mills based on the failures per 10,000 tons. Results are also given showing the

failures of the several mills divided into four classes.

7. A tabulation was made with special reference to the comparative failure performance of thick base and thin base rails, as explained above. The results indicate that the various types of section have about the same failure tendency, although on account of the differences in service no definite conclusions can be drawn as to the different types of section. The thin-base rails showed a somewhat larger percentage of failures as base breaks and broken rails, although the failures per 10,000 tons were about the same.

8. Comparisons were made of failures by weights of rail, but definite conclusions as to the failure performance of different weights of rail probably cannot be made from these statistics because of the difference of service to which the light and heavy rails are subjected. The comparisons indicate that the weight of rail per yard does not greatly influence the failures per 10,000 tons.

9. A comparison of the rails from the different ingot positions indicated that, as a general average, the failures classified as head failures of the "A," or top rail, were 2.7 times the failures of the other rails of the ingot in Bessemer steel and 1.8 times in open-hearth steel. In the failures classified as base breaks and broken rails the different rails of the ingot showed about the same failure tendency, or a little less in the "A," or top rail.

10. A comparison of rails made of steel treated with titanium with those of plain steel showed that in some cases the treated rails gave fewer failures per 10,000 tons than the plain rails, and in other cases the plain rails gave the smaller number of failures. As a general average the titanium-treated rails gave somewhat less failures per 10,000 tons.

11. It has been thought the failures occurring in a given length of track constituted a more equitable basis of comparison than the failures occurring in a given tonnage, which is the basis used heretofore. Several of the general tables have been recalculated, using failures per 100 miles of track as the unit of comparison, and it is expected this basis will be adopted for future reports.

12. The tables showed that, after a period of service of five years, as a general average, about 1 1/4 per cent. of the rails were reported as failed.

13. In conclusion it may be said that there were large differences in the failure performance of the rails from different mills. These differences were not great between different types of sections or between different weights of rail, taken as a general average, although there were large individual differences. The "A," or top rail, of the ingot showed a greater tendency toward head failure than the other rails of the ingot, but about the same failure tendency as regards base breaks and broken rails.

### Additional British Contraband of War

A supplement to the London Gazette gives revised schedules of absolute and conditional contraband. The following articles are made absolute contraband: Sulphuric acid, armor plates, hematite iron ore and hematite pig iron, iron pyrites, nickel ore and nickel, ferrochrome and chrome ore, unwrought copper, pig, sheet and pipe lead, aluminum, ferrosilicon, barbed wire and implements for fixing and cutting it, warships, etc., aeroplanes, etc., motor vehicles, etc., mineral oils and motor spirits, except lubricating oils, implements and apparatus designed for the manufacture of war materials, etc. The following are made conditional contraband: Vessels, docks, railroad materials, etc., fuel other than mineral oils, horseshoes and shoeing materials.

The placing of iron ore on the contraband list by the British Government has had the effect of bringing to Great Britain a heavy tonnage of hematite ore from Spain and Norway, destined for Dutch ports. One cargo was seized as a prize of war. As a result of this condition there is an abundance of ore in the Middlesbrough district.



## Lifting the Ferromanganese Embargo

WASHINGTON, D. C., November 17, 1914.—As a result of the activity of the State Department, in response to representations by President Farrell and Chairman Gary, of the United States Steel Corporation, it is believed that in a short time a definite arrangement will be concluded with Great Britain under which importations of ferromanganese from England and manganese ore from India, recently placed under embargoes, will be resumed and continued without further interruption. Messrs. Farrell and Gary recently complained to the State Department that a quantity of ore consigned to the Carnegie Steel Company had been held up at Bombay. It was represented that the early shipment of this ore to the United States was of unusual importance and the department was urged to take the matter up vigorously.

Under instructions from Secretary Bryan, a cable was sent to Ambassador Page, at London, who took the subject up with the British Foreign Office and subsequently advised our State Department that two shiploads of ore, held at Bombay, had been released and were on their way to the United States. Mr. Page also advised the department that the British Foreign Office was at work on a plan under which American consumers of ferromanganese and manganese ore would be permitted to import these products freely from any port in Great Britain or subject to British authority, conditioned upon a guarantee, possibly based upon a bond, that no part of such shipments would be subsequently re-exported in such a manner as ultimately to reach any of the countries now at war with Great Britain.

In view of the prompt release of the two shiploads of ore detained at Bombay, it is assumed that this particular shipment will be admitted without waiting for the completion of the arrangement now being perfected by the British Foreign Office, and it is also expected that arrangements will be put into force at an early date to obviate all further embarrassment to American consumers.

W. L. C.

F. J. Pickard, who has recently established the Franklin Sheet Metal Works at Franklin, Pa., will manufacture cellar doors, iron fences, balconies, fire escapes, stove and conductor pipe and other specialties, among the latter being a railroad camp bed made of iron, in two or three decks. The present shop is 48 x 60 ft., and the equipment installed consists of a 125-hp. Warren gas engine, 30-in. drill press, cold metal power saw, 37-in. forming machine, power press and a Peck, Stow & Wilcox squaring shear, to which will soon be added a 10-ft. conductor pipe corrugating and seaming machine made by the Canton Foundry & Machine Company, Canton, Ohio.

The Fenn Mfg. Company, Charlotte, Mich., on October 27 celebrated the opening of a new factory building by giving a reception to about 2000 of the residents of Charlotte and a number of guests from other places. The affair lasted all day and luncheon was served to all. George M. Fenn, president of the company, managed the celebration, which included a dinner in the evening to the city officials of Charlotte and the local commercial club.

At the regular monthly meeting of the Detroit Foundrymen's Association, held in Detroit, Mich., on the evening of November 12, H. M. Lane, foundry engineer, read a paper on "Reclamation of Old Foundry Sand." He explained in detail the workings of both the wet and the dry system, giving the results accomplished by considerable experimenting he had done along these lines.

Reports from Canada as to the letting of a contract for a building at Ojibway, Ont., by the United States Steel Corporation, are without foundation. Nothing whatever has been done at the site beyond some road work.

## Pittsburgh and Nearby Districts

The Pennsylvania Tank Car Company, Sharon, Pa., is operating its plant to full capacity, turning out about four tank cars per day. It has been operating night and day for some months. It now has more than 200 tank cars in leased service, with inquiries for more than 500. The situation among concerns that build tank cars for leasing only is unique compared with other industrial lines, in the fact that conditions are very active, the companies having a demand for more tank cars than they can furnish.

Pittsburgh parties are said to be negotiating for the lease of the plant of the Glen Mfg. Company, Ellwood City, Pa., intending to manufacture fire escapes, wire fencing and wire novelties. W. J. McKim, Ellwood City, Pa., is in charge of this plant, which has been idle for a long time.

Some of the more prominent coal operators in the Pittsburgh district have announced season prices on contracts, showing a reduction of 10c. per ton from the official prices a year ago. Coal prices are usually made in October, but trade conditions in the district have been so bad that the naming of prices for next year was deferred as long as possible. The contract prices for 1915 are as follows: Slack, 85c.; nut and slack, \$1.05; nut, \$1.15; mine-run, \$1.20; ¾-in., \$1.30; 1¼-in., \$1.40, all per net ton at mine. Operators naming these prices on contract have similarly announced temporary prices on prompt at \$1.15 for mine-run, \$1.25 for ¾-in. and \$1.35 for 1¼-in. Others of the larger companies have not announced prices, and one prominent interest states it will not do so before April 1.

The bi-monthly settlement of the puddling and finishing scales for bar-iron mills in the Central West that sign the Amalgamated Association scale was made last week. It was found that the average selling prices on common iron bars shipped out in September and October did not require a change in the puddling rate for November and December, which will remain at \$5.60 per ton, the same rate paid in September and October.

The United States District Court at Pittsburgh has handed down a decision refusing the petition filed by the Girard Trust Company to join the receiver of the Pittsburgh-Westmoreland Coal Company, Pittsburgh, in the foreclosure of a mortgage given by the coal company to secure payment of 6 per cent. two-year gold notes of \$1000 each, to the aggregate sum of \$900,000. Leave was granted to issue receiver's certificates in the sum of \$350,000 to carry on the business.

In the United States District Court at Pittsburgh the American Wringer Company, Woonsocket, R. I., and the Lovell Mfg. Company, Erie, Pa., and the sales managers of the two companies, George H. Chance, New York, and Charles S. Meachem, Erie, entered a plea of guilty to a violation of the Sherman anti-trust law. It was charged the companies own and control about 90 per cent. of the output of wringers and that they met and fixed prices. Each company was sentenced to pay a fine of \$2500 and costs and each of the sales managers a fine of \$500.

The Penn Rubber Traffic Company, Pittsburgh, has been granted a Delaware charter with a capital of \$150,000, to manufacture rubber tires and sundries for automobiles and other vehicles. The incorporators are William Boyd and W. I. N. and W. F. P. Loft, all of Dover.

The plant of the Babcock Lumber Company, Pittsburgh, at Davis, W. Va., has been destroyed by fire with a loss of about \$75,000. It will be rebuilt at once.

The Shenango Steam Boat & Transportation Company, Sharon, Pa., has filed notice of an increase in its capital from \$10,000 to \$1,500,000. This company controls three ore boats—the Shenango, the W. P. Snyder, Jr., and the J. M. Schoonmaker. The original capital of \$10,000 having been purely nominal, it was decided to increase it to an amount in line with the investment. The Shenango Steamship Company, another organization, controls two ore boats—the W. P. Snyder and the Wilpen. The two companies are largely allied interests.

of the Shenango Furnace Company, owning three blast furnaces at Sharpsville, Pa., and also W. P. Snyder & Co., Oliver Building, Pittsburgh, dealers in pig iron, steel and coke.

The report that the Firth-Sterling Steel Company, McKeesport, Pa., has received a large order for shells from the English government is incorrect. The company makes tool steels exclusively.

Furnace A of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has been blown out, making two of the four stacks idle. It is stated that the company has a stock of close to 100,000 tons of pig iron.

The United Engineering & Foundry Company, Pittsburgh, has purchased the patents of John W. Gebhard for hardening the faces of steel castings in the mold. While these patents were taken out several years ago by Mr. Gebhard, the process has only recently been developed to the point where commercially salable castings have been made. By this process, castings are produced with a hardened face for resisting wear. It is especially valuable for gears, cams, crown wheels, mill pinions, crusher jaws and castings of like character. The hardened surface penetrates from a depth of  $\frac{1}{8}$  to  $\frac{1}{4}$  in., according to the requirements of the work to be done by the casting. It is expected that the introduction of castings treated by the Gebhard process will reduce maintenance costs in rolling mills to a great extent.

It is stated that the Mercer County Light, Heat & Power Company will build a heating and lighting plant at Greenville, Pa.

The McAleenan Brothers Company, Twenty-fifth and Railroad streets, Pittsburgh, is in the market for a 100-ton sectional flange press.

#### American Drop Forgers Association

Steps have been taken to form a national organization of plant managers and superintendents of drop forge shops. A preliminary meeting was recently held at the Pontchartrain Hotel, Detroit, Mich. The organization will be known as the American Drop Forgers Association. A temporary association was formed by the election of R. E. Ellis, Detroit Forging Company, president; George Desautels, Anderson Forge & Machine Company, Detroit, vice-president; A. E. Dibble, Frost Gear & Forge Company, Jackson, Mich., secretary, and Superintendent Horn, of the foundry and forge department of the Packard Motor Car Company, Detroit, treasurer. Another meeting will be held at the Pontchartrain Hotel November 19 at which it is planned to complete the organization and to elect permanent officers. About 75 men, associated with the drop forging industry, who are eligible for membership, have announced their intention to become members.

The Enamel Products Company, Cleveland, Ohio, has about completed its new plant on Eddy road and the Belt Line, and expects to occupy it about December 1. The plant is a one-story structure, 80 x 260 ft. The company has planned to bring out a number of specialties in the line of enameled products.

The Canton-Hughes Pump Company, Wooster, Ohio, reports an improvement in orders from South America, Australia and other countries. As a result of the war, orders are coming to the United States that formerly went to Germany and other European countries.

The Russian Government Railways have ordered 30 locomotives from the Baldwin Locomotive Works and the Central of Vermont three from the American Locomotive Company. The Maine Central is inquiring for seven Mikado type locomotives.

The general offices of the Gary Screw & Bolt Company which up to October 1 were in the Commercial National Bank Building, 208 La Salle street, Chicago, are now at the works at Gary, Indiana.

#### Foundrymen's National Conventions at Atlantic City in 1915

The 1915 conventions of the American Foundrymen's Association and the American Institute of Metals together with the exposition of the Foundry & Machine Exhibition Company, will be held at Atlantic City in the week beginning September 27. The Foundry & Machine Exhibition Company has made arrangements to occupy the steel pier and the sessions of the two associations will be held in meeting rooms on the pier. The headquarters hotel will be announced later. A movement is on foot for the affiliation of the Associated Foundry Foremen with the American Foundrymen's Association and it is probable the change will be effected in the early part of the new year.

The seventh annual meeting of the American Institute of Chemical Engineers will be held in Philadelphia, Pa., December 2 to 5. A programme of excursions to a number of the large local chemical manufacturing plants is being arranged. A number of addresses and papers on "The Present Opportunities for American Chemical Industries" will be delivered by prominent chemical engineers and business men. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y., is secretary.

Net earnings of \$694,084, after allowance for depreciation, sinking funds, etc., and payment of fixed charges, are reported by the Dominion Steel Corporation for the six months ended September 30. This compares with \$1,548,903 in the corresponding period of last year. The decrease of \$854,819, or about 55 per cent., may be taken as a fair index of the depression against which the steel manufacturers have been struggling.

The Pan-American Trades Association has been organized in Indianapolis, with \$100,000 capital stock, to cultivate and develop trade with South American countries. The directors are Thomas Taggart, Charles A. Bookwalter, Gilbert S. Hendren and others. Part of the plan of the organization is to build exposition halls in the various countries for the display of American-made goods. B. M. Ralston is the active head of the association.

The new banking and currency law establishing the federal reserve banks has been abstracted in chart form, so that the business man may at a glance keep himself informed of the salient features of the act, by Marshall M. Ferguson, Hayden, Stone & Co., 25 Broad street, New York City. It is probable that a copy of the chart, which is about 11 x 17 in., may be had for a nominal sum, by addressing Mr. Ferguson.

That the Allis-Chalmers Mfg. Company, Milwaukee, Wis., has recorded a saving of \$6000 in actual money by reason of the use of goggles by workmen was the declaration of Dr. Nelson M. Black, a local oculist and eye specialist, in an address before the Milwaukee Efficiency Society November 12. Dr. Black spoke on the work done in Wisconsin in regard to the care of eyes of workmen and children.

At its monthly meeting November 11, the Chicago Local Council of the National Council of Industrial Safety elected the following officers: President, H. J. Bull, Chicago & Northwestern Railway; vice-president, Alexander Shayne, Middle West Utilities Company; secretary, A. W. Hitchcock, Western Electric Company; chairman of Publicity Committee, H. L. Brownell, Chicago Surface Lines.

President J. C. Maben, of the Sloss-Sheffield Steel & Iron Company, in an interview with a representative of Financial America, stated that the company now has 147,000 tons of pig iron in its yards. This is by far the largest quantity it has ever had on hand at one time. Only two furnaces are in blast.

## Judicial Decisions

ABSTRACTED BY A. L. H. STREET

**ACTS ACTIONABLE AS CONSTITUTING UNFAIR COMPETITION.**—It is an actionable wrong for a manufacturer, in order to acquire a monopoly in the sale of a certain product, to harass the salesmen or customers of a competitor, or to maintain suits for the infringement of patents which have expired, where the primary purpose is to stifle competition by wearing out competitors. (Michigan Supreme Court, Attorney General vs. National Cash Register Company, 148 Northwestern Reporter 420.)

**UNAUTHORIZED ACTS OF REPRESENTATIVES.**—When an agent does an unauthorized act, his principal is entitled to repudiate the transaction on discovering it, but the act cannot be partly ratified and partly repudiated. (Arkansas Supreme Court, Erout, Smulian & Co. vs. Outcault Advertising Company, 168 Southwestern Reporter 1075.)

**ASSIGNMENT OF PATENTS.**—The mere fact that one knows that a patent has been assigned does not prevent him from contracting with the patentee for the use of an improvement subsequently made by the patentee, nor from attacking the validity of the patent when sued for infringing it. (United States District Court, Western District of New York, Trussed Concrete Steel Company vs. Corrugated Bar Company, 214 Federal Reporter 893.)

**REQUIREMENTS UNDER OHIO FACTORY ACT.**—Under the Ohio factory act an employer is absolutely bound to cover, cut off, or countersink keys, bolts, set screws, and all parts of wheels, shafting, or other revolving machinery projecting unevenly beyond the surface of such revolving machinery. Hence, where an operator of a drill press was injured through his sleeve catching on a revolving, projecting set screw, the employer was negligent as a matter of law. In this case it appears that plaintiff was engaged in boring holes through steel plates; that he had finished boring several holes, and was in the act of shifting the steel plates so as to get the plates into position to drill another hole, when suddenly, and without any warning, the sleeve of his shirt caught upon the revolving set screw which held the drill in the shank, resulting in plaintiff's being whirled about the machine. (Ohio Supreme Court, Variety Iron & Steel Works Company vs. Poak, 106 Northeastern Reporter 24.)

**DUTY TO GUARD COGWHEELS IN PENNSYLVANIA.**—An employer's failure to equip cogwheels with a safeguard when that is practicable is negligence as a matter of law, rendering him responsible for any injury sustained by a workman in direct consequence of such negligence. (Pennsylvania Supreme Court, Fortney vs. Breon, 91 Atlantic Reporter 525.)

**EMPLOYER'S OBLIGATION TO SAFEGUARD MACHINERY.**—When the laws of a State require dangerous machinery to be safeguarded if practicable, a workman does not assume the risk of using machinery left unguarded in violation of such laws. (Oregon Supreme Court, Filkins vs. Portland Lumber Company, 142 Pacific Reporter 578.) A stationary engineer did not assume the risk of being injured on account of an unguarded set screw on a revolving shaft, if he did not know of its presence. (Arkansas Supreme Court, York Lumber Company vs. Dexter, 169 Southwestern Reporter 315.)

**RIGHT TO RESCIND PATENT CONTRACT.**—Under an exclusive license to manufacture and sell patent stokers on royalty, the patentee's breach of the contract by accepting a personal contract to install one of the stokers for a customer did not justify the licensee in refusing to proceed under the license, although he was entitled to damages on account of the patentee's breach. (United States District Court for the District of New Jersey, Crowe vs. Oscar Barnett Foundry Co., 213 Federal Reporter 864.)

**MINOR'S RIGHT TO RESCIND PURCHASE.**—A minor who purchased machinery for use in a foundry and plumbing business was entitled to rescind the purchase after reaching his majority, although he retained the ma-

chinery for three months after that time, using the same in the business and offering it for sale. To effectuate such ratification by a person of a contract made by him while a minor as will make the agreement binding upon him, the acts relied upon as showing a ratification must be inconsistent with any other purpose, as where, after attaining his majority, he retains and for an unreasonable length of time enjoys the beneficial use of property purchased while a minor, or exercises such acts of ownership over it as clearly evince a purpose to ratify. (West Virginia Supreme Court of Appeals, Hobbs vs. Hinton Foundry Machine & Plumbing Co., 82 Southeastern Reporter 267.)

**EMPLOYER'S RESPONSIBILITY FOR ASSAULT BY FOREMAN.**—A manufacturing company is liable for an assault and battery committed by a foreman in using excessive force to stop a fight between the employee assaulted and a co-employee, while the foreman was acting within the scope of his employment in preserving order in the factory. (Minnesota Supreme Court, Nettle vs. Flour City Ornamental Iron Works, 148 Northwestern Reporter 43.)

**ASPECTS OF SALES OF GOODS.**—Under a sale of goods, the quality of which is warranted by the seller, the buyer's failure to complain and return them within a reasonable time waives any right to rescind his purchase, but he may enforce a claim for damages resulting to him on account of any breach of the warranty. His delay in making complaint raises a presumption, however, that the goods were what they were warranted to be. (Washington Supreme Court, Fink vs. Marr, 142 Pacific Reporter 482.) A buyer who accepts goods after inspecting them cannot enforce a claim for failure of the property to conform to a description given by the seller; there being no warranty on the latter's part. (Oklahoma Supreme Court, Brown vs. Davidson, 142 Pacific Reporter 387.)

**IMPLIED WARRANTY IN SALE OF ELECTRIC WIRE.**—In a sale of wire to be used in the transmission of electricity, under a contract specifying the diameter of the wire and its conductivity, there is no implied warranty that the wire will accomplish all that is expected of it by the buyer; but there is an implied warranty that it is properly constructed of wire of the kind and size specified, and reasonably suited for use. (Georgia Supreme Court, John A. Roebbling's Sons Company vs. Southern Power Company, 83 Southeastern Reporter 138.)

**INJURY TO EMPLOYEE ON WAY TO WORK.**—An injury incurred by a workman in traveling to his place of work, and not on the premises of the employer, does not give him the right to an award from the West Virginia workmen's compensation fund, unless the place of injury was brought within the scope of employment by an express or implied requirement in the contract of employment of its use by him in going to and returning from his work. (West Virginia Supreme Court of Appeals, De Constantin vs. Public Service Commission, 83 Southeastern Reporter 88.)

**WHEN CARRIER IS LIABLE FOR VALUE OF FREIGHT.**—By delivering a shipment to the buyer thereof without production of a bill of lading consigning the freight to the seller's order, the bill having been attached to a draft on the buyer, the delivering railroad company renders itself liable to the shipper for the value of the freight, on the buyer failing to take up the draft. (Blish vs. Georgia, Florida & Alabama Railway Company, 82 Southeastern Reporter 784.)

**FAMILY NAME AS TRADEMARK.**—Although a manufacturer is not entitled to acquire a technical trademark on his family name, so as to be entitled to enjoin infringement on a competitor of the same name adopting it, the courts will relieve the earlier user of the name against the other's use of the name in such way as to deceive the buying public into believing that in buying the less well-known manufacturer's product they are getting the better known goods. The new comer must so qualify use of the name that no deception will arise. (United States Circuit Court of Appeals, Seventh Circuit, Chickering vs. Chickering & Sons, 215 Federal Reporter 490.)



# The Machinery Markets

The slight betterment in domestic business in machine tools continues to hold up, although without the heavy export orders now being received the trade would be in a bad way. As it is, the demand from abroad is not spread out enough to directly benefit the industry at large. New England is feeling the effects of the large demand for shrapnel and other war material. In New York some good orders have been placed and more are in the air. The betterment in machine tool demand continues in Cleveland, additional export orders have been placed and the general sentiment in manufacturing lines is improved. In Cincinnati the large purchasing for export more than offsets the quiet domestic demand, while inquiries are improving. Export buying continues brisk in Milwaukee also, although the domestic trade is disappointing. Power equipment is moving well in Chicago, but the machinery trade otherwise finds but little new business except that which has developed from the requirements of armament manufacturers. Second-hand machinery is more active in Detroit and there is an improvement in the volume of general business, but the foreign business is not enough to arouse interest. In the central South the number of new manufacturing enterprises is larger than for some time and optimism is growing. Machine tools are in better demand in the Birmingham district, but woodworking machinery is quiet. In Texas a slight betterment in the demand from industrial plants is noted. In St. Louis inquiry is a little more plentiful. Trade on the Pacific coast is quiet, the lumber industry operating only about 40 per cent.

## New York

NEW YORK, November 18, 1914.

Business in machine tools of the kind which has nothing to do with war materials is picking up and the trade is feeling better, but it is more the fact that the trend is in the right direction that cheers local salesmen and managers than the actual aggregate sales. Demand for machines to make war materials is still in the air and some good orders have been placed. The recent buying by the Fore River Shipbuilding Corporation was more extensive than was supposed, the purchases including radial drills, a vertical miller, a large Gisholt turret lathe, some brass lathes and other machines. All were bought in a rush.

Some of the local dealers have experienced a good demand in the last week for second-hand machine tools for miscellaneous uses.

The Baldwin Locomotive Works, which has been a heavy buyer for export to Russia, has bought 7 large Warner & Swasey turret lathes and is said to be considering the making of shrapnel, in which case more equipment will be needed. It is understood that if the locomotive works takes up this work, which many other concerns are seeking to do, it will sublet the making of the timing mechanism to a large New Jersey watchmaking company. The company also purchased 2 Gridley automatic screw machines.

The New York Air Brake Company has inquiries out for the necessary equipment to make shrapnel and provided it gets a contract through an agency in touch with foreign governments it will place orders for the tools. A New York company with English connections, and which does an export business, has been making inquiries for a number of machine tools for ammunition work, but no orders have been placed as yet.

The trade has submitted quotations to G. Amsinck & Co., New York, for an extensive list of equipment for a railroad in South Africa. Tools and equipment are wanted for a machine shop, boiler shop, carpenter shop, steel casting plant, etc. The quotations were for tools with electric drive, packed for export, delivered f.o.b. New York.

A Cincinnati machine tool maker advises that its business in lathes for export has been good, 4 to 5 orders for 2 to 10 machines being received each week, the sizes running 14-in. to 18-in. An exporter of machinery to France has experienced some difficulty because the French ships are congested with commissary supplies and other materials consigned to the French Government and which take precedence over ordinary shipments.

Plans are being drawn for a vocational high school at Syracuse, N. Y., according to press reports.

The Honolulu Iron Works Company, New York, has bought equipment for a sugar mill it is building in Cuba and will purchase more. Electrical equipment will be wanted and among other items a 42-in. lathe.

The East Jersey Pipe Company, East Thirty-sixth street, Paterson, N. J., is planning to build a lock bar pipe mill to cost considerably more than \$100,000. Plans are now under consideration, but the site has not been definitely settled on. T. H. Gillespie is president and J. A. Nelson is vice-president.

Plans have been filed covering the erection of a one-story brick shop, 100 x 200 ft., for the E. W. Bliss Company, 11

Adams street, Brooklyn, N. Y., to cost \$35,000. Walter Pfaendler, 75 Pineapple street, Brooklyn, is the architect.

The J. Sklar Mfg. Company, 133 Floyd street, Brooklyn, N. Y., manufacturer of surgical instruments, is building a four-story brick factory, 66 x 113 ft., to cost \$35,000. Joseph Sklar is in charge.

The Albany Norwalk Vault Company, Colonie, N. Y., has been incorporated to make steel forms for concrete work, burial vaults, etc. Frank A. Sherer, 282 Morton avenue, Albany, N. Y., is managing director.

Plans are being completed for the rebuilding of the paper mill of R. S. Hoffman, Baldwinsville, N. Y., which was recently destroyed by fire.

Rupfer & Remick, contracting engineers, Buffalo, have received the contract for Barge Canal contract M—section 1—to include power plants, electrical equipment and machinery for operating and lighting locks Nos. 1, 2, 3 and 4 on the Cayuga and Seneca Division, amounting to \$188,035.

The Utica Box Company, Utica, N. Y., has been incorporated with a capital stock of \$35,000 to manufacture boxes, cartons, etc. A. W. Britton, W. P. Powell and T. S. Buckingham, New York City, are the incorporators.

The Motor Cycle Car Corporation, Buffalo, has been incorporated by C. M. Babbitt, 253 West Utica street, Buffalo, and E. W. and A. E. Bennett, Grand Island, N. Y., to manufacture motorcycles.

The Modern Fasteners Corporation, Great Neck, N. Y., has been incorporated with a capital stock of \$30,000 to manufacture special machinery, tools, etc. C. G. Campbell and S. Newton, New York City, and W. R. Baird, South Orange, N. J., are the incorporators.

The Eversharp Overshoe Company has been incorporated to manufacture a patented overshoe for horses. It will be manufactured for the present under contract; but the company plans to build its own plant soon. William Lewin is president. Israel N. Thurman, 141 Broadway, New York, the secretary, should be addressed.

The Continental Welding Company of New York has been dissolved.

The International Foundry Company, Syracuse, N. Y., has been incorporated to manufacture a patented brake shoe. Its product will be manufactured by contract for the present, as no building plans have as yet been formulated. F. E. Ehrgood is secretary.

The Syracuse Motor Car Company, 235 West Genesee street, Syracuse, N. Y., plans to build a garage to cost about \$20,000. David Grody and Simon Silverman are in charge.

The Elizabeth Jewelry & Finding Company, Elizabeth, N. J., will erect a factory at 820 Livingston street, to cost \$2500.

The Vacuum Oil Company, Olean, N. Y., will build an addition to its refining plant to cost \$125,000. Charles M. Everset is president.

The Santo Rubber Company, Niagara Falls, N. Y., will not let the contract for the first unit of its proposed plant at Niagara Falls until next spring or summer. This unit will cost between \$60,000 and \$70,000. D. A. Crone, Oliver Building, Pittsburgh, Pa., is the supervising architect. E. T. Brockman is president.

## Philadelphia

PHILADELPHIA, Pa., November 16, 1914.

The Harshaw, Fuller & Goodwin Company, manufacturer of acids, 317 Electric Building, Cleveland, is making alterations to its plant at Swanson and Jackson streets, Philadelphia, to cost \$3000.

P. S. Tyre, architect, 1509 Arch street, Philadelphia, has drawn plans for a two-story brick garage and shop to cost \$11,000, for Jennie Fryman, 168 North Twenty-second street. Mitchell Brothers, 2125 Race street, are the contractors.

Roydhouse, Arey & Co., Fidelity Building, Philadelphia, Pa., has been awarded the contract for alterations and addition to the engine and boiler house of the Glen Mills School, Glen Mills, Pa., 43 x 102 ft., one story, of brick and steel, to cost about \$25,000.

It is reported that the Tindel-Morris Company, Eddystone, Pa., is making additions to its plant to cost about \$100,000.

The Audet Novelty Mfg. Company, 741 Grace street, Williamsport, Pa., manufacturer of furniture hardware, has moved into a new factory at Park and First streets. A. N. Audet is general manager.

## New England

BOSTON, MASS., November 17, 1914.

The chief subject of discussion in machine-tool circles is the shrapnel shell. The Russian government is placing orders for 2,000,000 of this type of field gun ammunition, of about 3-in. caliber. Without the firing mechanism, the price to the American manufacturer is about \$12,000,000. With the fuse attachment, which is carried for the most part in the nose of the shell, the total cost to Russia will be about \$18,000,000. This business is absolutely new—it is in addition to other business of the same description that has already been placed, bringing the total of money which will be paid to American manufacturers who have the facilities for handling this product, to extremely large figures.

The best part of the shrapnel business is that it must be distributed. The shell proper is a steel forging, produced in heavy presses that can handle the metal hot. It must be machined—bored internally and turned externally, or grinding operations may be substituted. The firing mechanism is carried in the soft metal nose and through a tube to the chamber at the base, where the exploding powder charge is contained. In making these parts automatic and screw machines must be employed. Probably the great shrapnel order will be delivered ready for loading upon the arrival of the shells in Russia.

The magnitude of the volume of war materials is realized by few persons. Public announcements total tremendous figures; and a goodly number of manufacturing houses are keeping their new business quiet. The ramifications of these orders are not easy to comprehend. Every good-sized contract means the buying of materials and supplies; and the "rows of bricks," to use an old simile, extend in many directions, stimulating industry. Stocks of materials and supplies are low almost everywhere, and therefore general buying must increase with each succeeding order.

To take this great order for shrapnel as an illustration, the buying will extend to machinery, materials and supplies in a broad way. The influence should be felt in a wide variety of industry. It is also becoming quite evident that the results of previous orders from Europe are of no small account.

The consensus of opinion among manufacturers in metal lines is that the worst has been passed. The curve from now on should be upward, they believe; not a sharp upward lift of the line, but a rather gradual one, yet always toward better business. Most observers who are watching the situation keenly look to see 1915 a most profitable year for American industry.

Apart from machine-tool orders which are traceable to the demand for war materials, some orders are being received for those types of machines which have not yet had a part in the stimulation. This is particularly true with planners of moderate size.

The Winchester Repeating Arms Company, New Haven, Conn., has awarded the contract for a factory building, 54 x 105 ft., four stories and basement, of reinforced concrete. It plans other extensive additions. The target range will be moved to the other side of the railroad tracks; a bridge will afford access to this department. The drop forge shop in the gun shop yard will also be removed and will be replaced by new buildings. These improvements do not include all of the prospective enlargements, for other structures will be built to give additional manufacturing space.

Advices from Bridgeport, Conn., state that the Union Metallic Cartridge Company has practically doubled the size

of its proposed new factory buildings. A structure which was designed to be 64 x 144 ft., will be 64 x 672 ft. Foundations already in for a factory 48 x 240 ft., with ell 48 x 48 ft., will be increased to double the size.

The American Chain Company, Bridgeport, Conn., is about to begin the erection of two buildings, 50 x 150 ft. and 50 x 200 ft., one story.

The Paul Whitin Mfg. Company, Rockdale, Mass., will build a machine shop 40 x 60 ft., one story.

The Weir Stove Company, Taunton, Mass., will add to its core room.

The Scovill Mfg. Company, Waterbury, Conn., brass manufacturer, will erect a factory on East Main street, which will occupy the site of several old buildings.

The Essex Association, Haverhill, Mass., will erect a nine-story addition to its shoe factory to cost \$75,000.

## Chicago

CHICAGO, ILL., November 16, 1914.

Aside from that business which has developed directly out of the need of armament manufacturing equipment, machinery interests are finding very little new business. At Madison, Wis., one of the turret lathe manufacturers is working on a 24-hour day schedule, turning out equipment to fill an order previously reported. There is also an active demand for power machinery, particularly electrical equipment from the zinc smelters in Wisconsin who are being called upon for zinc for export and are finding their plants in need of rehabilitation. Some of the railroads are inquiring in a general way regarding their next year's requirements, but, with the exception of an occasional tool, the prospect for business is not very definite.

The Federal Steel Rack Company, Chicago, has been organized in the offices of Vincent D. Wyman, 139 North Clark street, with a capital of \$20,000.

The Western Valve Company, Chicago, has been incorporated by H. V. Conine, E. M. Ashcraft, Jr., and C. F. Rathbun with a capital stock of \$100,000 to do a general manufacturing and mercantile business. Ashcraft & Ashcraft, attorneys, 108 South LaSalle street, should be addressed.

W. W. Nugent & Son, Inc., Chicago, has been organized with a capital stock of \$25,000 by Colin C. H. Fyffe, Paul N. Dale and Leo Brewer. Fyffe, Ryner & Dale, 111 West Monroe street, are the attorneys. The company will manufacture and deal in oiling systems, filters, devices, etc.

Hanson Brothers, 525-529 North Ada street, Chicago, will build a two-story brick factory to cost \$15,000.

The McKinney Tractor Company, Belleville, Ill., has been incorporated with a capital stock of \$200,000 by Edward Abend, G. A. Becker and H. E. Kniephamp to operate and enlarge an existing plant.

The Playford Mfg. Company, Elgin, Ill., recently incorporated, will manufacture machinery, tools, novelties, devices, etc.

The Quincy & Hamilton Electric Railway Company, Hamilton, Ill., has been incorporated with a capital stock of \$525,000 to operate an electric railway line from Quincy to Hamilton. C. S. Carscallen, C. D. Warren, E. D. Parkelee, C. H. Petsch, W. H. Orr, E. W. Wood and R. R. Wallace are the incorporators.

The Joliet Wrought Iron Washer Company, Joliet, Ill., has been incorporated with a capital of \$20,000 to manufacture castings for building purposes. It is to be located on East Washington street. J. H. Garnsey, M. F. Lennon, and others, are the incorporators.

Fire destroyed the entire plant of the Canton Milling Company, Canton, Kan., and the city's new electric light plant. The milling company's loss is about \$20,000 and the city's loss about \$7000.

Bonds have been sold by Nisland, S. D., for a waterworks system.

Orchard, Neb., has voted bonds to cover the installation of a water system.

The Lion Tractor Company, 1704 Second street, North Minneapolis, Minn., has been formed by officials of the Diamond Iron Works of the same address. It has arranged to have the Diamond Iron Works manufacture its patented tractor. G. A. Bingenheimer is president of both companies.

Hudson, Wyo., has voted \$20,000 of bonds for a waterworks system.

Minneapolis, Minn., has voted to issue \$1000 of bonds for the installation of a municipal ice plant. It is reported that additional plants may be erected elsewhere in the city.

The New Lite Mfg. Company, Newton, Iowa, manufacturer of portable lighting plants, fireless cookers, etc., has

increased its capital stock from \$25,000 to \$50,000. It is about to award the contract for the construction of a two-story and basement brick factory, 40 x 160 ft., to be erected at Boone, Iowa. H. L. Ogg is president and H. E. Gove is general manager.

The H. H. Latham Machinery Company, Springer Building, Canal street and Jackson Boulevard, Chicago, builder of printing machinery, has acquired property at Fulton and Ann streets on which a three-story mill building will be erected.

The Hot Point Electric Heating Company, Chicago, which has had sales offices and assembling quarters at 1001 Washington boulevard, has acquired a factory on Ogden avenue.

Malta, Ill., has appropriated \$15,000 for the installation of a water pumping station, etc., and a contract has been awarded to the National Construction Company, South Bend, Ind.

The contract for the waterworks system of Ashton, Ill., was let to W. F. Hoy, Woodstock, Ill.

The Rural Union Telephone Company, Rushville, Ill., has been organized with a capital stock of \$8000 by J. W. Lambert, D. S. Turner and C. L. DeWitt.

The Standard Chemical Company, Des Moines, Iowa, is building a three-story reinforced concrete factory, 50 x 100 ft., to cost about \$25,000. G. D. Ellyson is president.

Fayette, Iowa, it is reported, will make improvements to its municipal lighting plant.

The Thief River Falls Marble, Granite & Stone Works, Thief River Falls, Minn., has been incorporated with a capital stock of \$50,000. It will erect a factory next summer to take the place of its present quarters. I. G. Sands is president and Hugh Jeffrey, superintendent.

Luverne, Minn., has awarded the contract for a power house to Greene & Jensen, Luverne, and the contract for the construction of the accompanying smoke stack was awarded to the General Concrete Construction Company, Minneapolis.

The Lyle Corrugated Culvert Company, 171 Twenty-seventh avenue, Southeast, Minneapolis, Minn., manufacturer of sheet metal products, is erecting a second story to its factory to cost \$10,000. It is not in the market at present for any additional equipment.

Ceylon, Minn., is receiving bids for a municipal electric light plant, one story, 25 x 50 ft., of concrete block construction, to cost about \$8000. Earl D. Jackson, Capital Bank Building, St. Paul, is the engineer.

## Milwaukee

MILWAUKEE, WIS., November 16, 1914.

Buying for export account continues brisk. It is apparent that American purchasing agents for belligerent as well as peaceful countries of Europe are coming further westward to fill their orders. Domestic demand continues disappointing and very little new business is being booked, with no prospect of anything like a decided revival before early next year. Municipalities are sustaining the trade in power and pumping machinery, electrical equipment and in fact almost every line of the metal trades. Urgent necessity of replacement has brought scattering orders to milling machinery people. The State free employment bureau reports a slight increase in the demand for common labor; but skilled labor is flooding the market. As is usual at this period, new construction figures show a decided falling off, but there is every reason to believe that a number of important building projects delayed from six to twelve months because of unfavorable financial conditions will mature around January 1 for early spring work.

Lew F. Porter, secretary of the capitol commission, Madison, Wis., will close bids December 15 for the equipment and finishing of the north wing and two pavilions of the new \$6,000,000 capitol. The work will include boilers, elevators, etc. George B. Post & Son, New York City, are the architects.

The Aerial Cutlery Company, Marinette, Wis., is operating overtime and it is likely that the equipment will be increased about January 1.

J. W. Heffner and John Berg, Two Harbors, Wis., have purchased a site at Barron, Wis., and will build a garage and machine shop.

The Shaw Motor Company, Chicago, Ill., has broken ground for its gasoline engine plant at Prairie du Sac, Wis., and has filed articles of incorporation to do business in Wisconsin as a foreign corporation, with a capital stock of \$1,000,000 and a Wisconsin interest given as \$30,000. At Prairie du Sac it will have the use of the old Kahn foundry, in which it will produce all light castings. Heavy parts will be cast in contract with Chicago and Wisconsin foundries. The shop now under construction will be 61 x 109 ft., of brick and tile, with saw-tooth roof.

Articles of incorporation have been filed by the Genesee Mfg. Company, Waukesha, Wis. The capital stock is \$6000 and the incorporators include R. G. Morey, W. C. Stephen and G. C. Morey.

The Van Brunt Mfg. Company, Horicon, Wis., a subsidiary of the John Deere interests, Moline, Ill., has resumed operations after a lay-off since September 1. The plant produces seeders, drills and other farm implements and machinery.

The new Milwaukee works of the Westinghouse Lamp Company of New York is now in complete operation and working on the basis of approximately 600,000 lamps monthly.

Hayward, Wis., has voted in favor of a bond issue of \$12,000 for an artesian well waterworks system. Plans will be prepared by W. G. Kirchhoffer, engineer, Madison, Wis.

Black Earth, Wis., has voted \$5000 of bonds for an electric lighting plant.

The Burlington Brass Works, Burlington, Wis., has been inquiring for a No. 4 open back inclinable punch press.

The National Machine Tool Company, Racine, Wis., is inquiring for a 12-in. speed lathe with three-jaw chuck and slide rest, an 18-in. lathe and a 14-in. or larger shaper.

## Detroit

DETROIT, MICH., November 16, 1914.

The market continues quiet, but there has been a slight improvement in the volume of business, principally due to a better run of single tool sales. Second-hand machinery is also developing more activity, especially in the demand for light and metal-working tools. Wood-working machinery, both new and second-hand, is dull. There is some foreign inquiry before Detroit manufacturers, but not enough to arouse any considerable interest. The domestic trade shows little change, although a better run of orders is being received by some concerns. Contractors are somewhat better engaged but every indication points to a quiet winter in building circles.

The Winkley Company, Detroit, manufacturer of metal specialties, has let the contract for the erection of a one-story addition to its factory at 866 West Warren avenue.

The Detroit Boiler Specialty Company, Detroit, has been incorporated with \$15,000 capital stock by W. E. H. Lang, W. S. Reynolds and D. M. Kerr.

The Wilmot Chair & Seating Company, Detroit, has been incorporated by J. F. Wilmot, W. H. Wilmot and F. B. Wilmot, with a capital stock of \$10,000.

Contracts have been let for the erection of a one-story addition to the plant of the Maxwell Motor Company, Oakland avenue, Detroit.

The Michigan Storage Battery Company, Detroit, has been incorporated with \$50,000 capital stock by Louis C. Knop, Emil G. Knop and Noble T. Lawson.

The Upton Machine Company, St. Joseph, Mich., has purchased the business of the American Tool Works, manufacture of air rifles and popguns. The Upton Company recently increased its capital stock to \$75,000 and plans a considerable extension of its business. The officers of the company are: President, C. F. Braffort; treasurer, E. A. Blakeslee, and secretary, Emory Upton.

H. C. Hansen, president of the United States Gas Machine Company, Muskegon, Mich., has disposed of his interests in that company to Fred Schuler and Harm Friesma, owners of the Muskegon Pattern Works, and a reorganization of the Gas Machine Company will take place. The plant of the latter company will be removed to the pattern works plant and will be operated in connection with that industry.

The Onaway Electric Light & Power Company, capitalized at \$16,000, has been purchased by C. H. Osgood, Rogers City, Mich., and J. R. Jenkins, Alpena, who contemplate making extensive improvements. Mr. Jenkins is president; Mr. Osgood, vice-president, and Alexander Robertson, Ionia, secretary.

The Chevrolet Motor Company and the Mason Motor Company, Flint, Mich., have acquired vacant property adjacent to their plants, for the purpose, it is reported, of making important extensions.

The Cutler Hub Company has purchased a site at Traverse City, Mich., and will erect a plant.

The Perfection Coil Spring Company, Jackson, Mich., has been incorporated with a capital stock of \$50,000 and will engage in the manufacture of vehicle and other springs.

The Bean Spray Pump Company has been organized at Lansing, Mich., and a factory building is under construction.

The Havers Motor Car Company, Port Huron, Mich., whose plant was recently destroyed by fire, has filed a petition for a receiver in the United States Court at Detroit.



The Auto Body Company, Lansing, Mich., is completing a large addition to its plant.

The city of Detroit will receive bids about January 1 for a complete garbage plant, including garbage reduction machinery and various handling equipment. Plans have been prepared by Smith, Hinchman & Grylls, engineers, Detroit.

The North American Construction Company, Bay City, Mich., manufacturer of Aladdin ready-built houses, has begun the erection of a factory building, 96 x 256 ft., two stories.

The Schust Baking Company, Saginaw, Mich., is erecting a five-story factory and a power house.

The Kellogg Toasted Corn Flakes Company, Battle Creek, Mich., has in course of construction an addition to its No. 1 plant, 100 x 100 ft., five stories.

The Covell Mfg. Company, Benton Harbor, Mich., is doubling the capacity of its foundry.

The Hardie Mfg. Company, Hudson, Mich., manufacturer of sprayers, will increase its capital stock to provide for the erection of an addition next spring.

The Bay City Pipe Company, Bay City, Mich., will erect a factory building.

The Cutler Hub Company, Saginaw, Mich., will remove its business to Traverse City, Mich., where a factory will be erected.

The Northern Graphite Company, L'Anse, Mich., will enlarge its plant and install additional machinery.

Frederick Seeburger, Riga, Mich., is planning the erection of a factory and will engage in the manufacture of automobile parts.

## Indianapolis

INDIANAPOLIS, IND., November 16, 1914.

The Hammond Malleable Iron Company, Hammond, Ind., recently incorporated, has started the construction of a plant for the manufacture of automobile castings and agricultural implements, to cost about \$50,000. It will consist of a foundry, 70 x 340 ft., pattern shops and annealing and shipping departments, 80 x 180 ft. The initial installation will include a 20-ton furnace and four ovens. No equipment has as yet been purchased. Henry J. Wanner, 180 North Dearborn street, Chicago, is president.

The Sidway Mercantile Company, Elkhart, Ind., will build a 100-ft. brick addition to its factory, two stories.

The Marion Motor Car Company, Indianapolis, was purchased at receiver's sale by J. I. Handley, president of the company. The plant had been operated several months under friendly receivership, and will continue in operation.

The Wizard Motor Company, Indianapolis, has been dissolved.

The Fletcher Savings & Trust Company has been appointed receiver for the R. J. Irving Mfg. Company, Indianapolis, manufacturer of auto bodies and tops.

The Marshall-Huschart Company, Chicago, will establish a machine shop at Newcastle, Ind., to employ 25 to 30 men. It will use the building formerly occupied by the Safety Shredder Company.

The Middletown Reduction Company, Middletown, Ind., has been incorporated with \$10,000 capital stock, to operate a garbage reduction plant. The directors are F. B. and M. Hupp and M. M. Miller.

The Economy Oil Heating Company, New Albany, Ind., has been incorporated with \$10,000 capital stock to manufacture oil heating and cooking articles. The directors are A. D. Fleshman, L. C. Mount and M. M. Mount.

The Zimmerman Buggy Company, Auburn, Ind., has been incorporated with \$10,000 capital stock to manufacture vehicles. W. P. Henderson, A. D. Schlatter and M. Boland are the incorporators.

The Co-Operative Planing Mill, owned by John Seaman and George Losh, Martinsville, Ind., was burned November 7 with a loss of \$3500. In the same fire the lumber plant belonging to Claude Hill, Martinsville, and S. X. Corbin, Stanford, suffered a loss of \$25,000. The latter plant was operated by electricity.

The Home Silo Company, Vincennes, Ind., has been incorporated with \$25,000 capital stock to manufacture silos. The directors are A. A. Clark, A. H. Kauser and A. B. Lackey.

The Electric Metals Company, Indianapolis, Ind., has been organized with a capital stock of \$10,000 to sell and erect electric furnaces, by H. H. Buckman, Jr., George A. Pritchard and M. R. Buckman.

The Alexander Spreader Company, Lebanon, Ind., has bought the Caldwell Mfg. Company, Columbus, Ind., and has moved to the latter city.

## Cleveland

CLEVELAND, OHIO, November 16, 1914.

The slight improvement recently reported in domestic orders for machine tools is holding up, this business coming mostly in scattered single tool orders. Some additional foreign orders have been placed and others are pending. While the sentiment in general manufacturing lines has improved considerably, conditions continue dull, except with companies that are affected by foreign orders. Automobile plants, with the exception of those that have orders from abroad for motor trucks, are running light. Conditions continue quiet in the foundry trade. Shops that do a general jobbing business and those that specialize on automobile work are running at about 50 per cent.

The Central Steel Company, Massillon, Ohio, expects to place orders shortly for equipment for its machine shop. This will include two lathes, a planer, wheel press, steam-hammer, bolt-cutter, hack-saw and grinder.

Cleveland, Ohio, is in the market for filtration equipment and operating machinery for its new filtration plant. Sealed proposals will be received by the commissioner of purchases and supplies December 2.

The Horning Electric Company, Cleveland, maker of electric lighting and starting and ignition systems for automobiles, will move from West Third street to larger quarters at 1733 East Twelfth street.

The Silver Ray Lamp Company, Cleveland, is the name of a new concern that will establish a plant in a factory at 1315 East Fortieth street, for the manufacture of automobile lamps.

The Way-Sagless Spring Company, Cleveland, manufacturer of bed springs, will move from its present site on James street to larger quarters at Merwin and Center streets. No new machinery will be required.

The Brennan Steel Castings Company, Cleveland, has increased its capital stock from \$10,000 to \$60,000.

The plant of the Suspension Roller Bearing Company, Sandusky, together with the greater part of the machinery, will be offered for sale at public auction November 28, this sale having been decided upon by the board of directors. It will retain its wheel machinery and expects to continue the manufacture of buggy and wagon wheels; but plans to discontinue the manufacture of ball bearings.

The Buckeye Machine Company, manufacturer of combustion engines, Lima, Ohio, is in the market for a complete foundry equipment, preferably a good second-hand one. A 6 to 8-ton cupola is specified. L. F. Helms is secretary.

The Lorain Hydro & Aerial Company, Lorain, Ohio, has been organized with J. E. Papin as president; J. J. Kelly, vice-president, and W. F. Banning, secretary and treasurer. It has acquired the equipment of an Akron concern that is engaged in the manufacture of aeroplanes, and will establish an assembling department.

The plant of the Norwalk Vault Company, Norwalk, Ohio, was burned a few days ago. It is stated that the contents, including engine and boiler, two drill presses and a number of wood-working machines, was a total loss. The plant will probably be rebuilt as soon as possible, as the company had considerable work on hand.

James H. West and E. J. McElroy, will establish a plant in Ada, Ohio, for the manufacture of a patented collapsible shipping case.

## Cincinnati

CINCINNATI, OHIO, November 16, 1914.

It is the opinion of a leading local financier that the opening of the cotton exchanges will have a more beneficial effect on general business than the public realizes. While it is known that many manufacturers of special articles, such as typewriters, cash registers, etc., are still suffering severely from the effects of the war in Europe, these losses are more than outbalanced, even in this territory, by the large total of purchases from abroad of machinery and other equipment and supplies. As some of these orders include materials that are considered contraband of war it is difficult to obtain the exact figures.

Additional orders for lathes are reported, and a well-informed machine-tool builder estimates that Cincinnati manufacturers have under negotiation inquiries covering 500 to 1000 machines that will probably be closed at an early date. Some of these inquiries are from regular agents in Europe for small lots, indicating that they are for industrial shops. There is also some demand for boring mills and milling machines. To a certain extent, the large export business booked has had a beneficial effect on domestic trade. More inquiries are being figured on from this country than for

some time and these are generally distributed among manufacturers of different kinds of machine tools, not being confined to any particular line.

Quite a number of local machine-tool plants are now operating night shifts, and included in the last to announce putting on a night force is the Acme Machine Tool Company. The Cincinnati Planer Company, which has been operating with a reduced force, started up this morning with a full quota of workmen. Neither the demand for shapers nor wood-working machinery is very good. Boiler and tank makers expect to wind up the year with a record close to that of last year.

The Cincinnati Automatic Machinery Company, Cincinnati, announces that it is now ready to market its new automatic screw machines.

Arthur E. Jones, Hyde Park, Cincinnati, is reported to be interested in a 20-ton ice plant to be erected at Loveland, Ohio. The Reliance Engineering Company, Cincinnati, is drawing the plans.

The Haven Malleable Castings Company, Cumminsville, Cincinnati, suffered a fire loss November 10 estimated at \$10,000. Rebuilding of the damaged portion will begin at once.

The Reliance Textile Company, Second and Russell streets, Covington, Ky., has tentative plans for an addition to its plant to cost about \$20,000.

The C. C. Fouts Company, Middletown, Ohio, has been incorporated with a capital stock of \$75,000 by C. C. Fouts, C. R. Oglesby, Paul Fouts and A. A. Ambler, Middletown, and P. H. Rogers, Columbus. It will take over the business of the C. C. Fouts Tank & Silo Company, Tenth and Canal streets, Middletown, manufacturer of silos, bins, troughs, shelving, etc.

The Superior Oxygen Company, Defiance, Ohio, has been incorporated with \$300,000 capital stock by Curtis M. Willock, George H. Roberts, and others.

The Royal Printing Machinery Company, Springfield, Ohio, of which E. O. Cartwright is general manager, contemplates fitting up a plant for the manufacture of a patented automatic printing press.

W. W. Neary, Wellston, Ohio, is interested in a company being organized to erect an ice plant.

Zanesville, Ohio, capitalists are interested in a company that is being formed to build a \$250,000 canning and packing plant, to be located at some point between that city and Columbus.

## The Central South

LOUISVILLE, Ky., November 16, 1914.

One encouraging feature in the machinery situation is that jobs which have been figured on without result are not being abandoned, in most cases, but are postponed until the turn of the year. Prospective purchasers appear to believe that conditions are improving, and that by the end of this year the outlook will justify expenditures for new equipment. The number of new manufacturing enterprises coming out locally is much larger than for some time, and a generally healthy condition is developing. While the volume of actual orders being handled is not much larger than heretofore, members of the trade are greatly encouraged, and feel that business will soon be improved.

The Columbia Sanitary Mfg. Company will be incorporated by members of the Laib Company, 427 West Main street, Louisville, with \$100,000 capital stock to manufacture plumbing supplies. A plant will be located at Eighteenth street and Magnolia avenue, and will be of steel construction. It will include a foundry, 100 x 200 ft., and an enameling department, 90 x 100 ft. Second-hand machinery has been purchased for most of the equipment. George H. Laib is president and W. G. Probst general manager. Construction work will begin at once.

The Eureka Window Shade Company, Louisville, has been incorporated with \$100,000 capital stock, and plans to establish a factory for the manufacture of a patented window shade. Definite arrangements have not yet been made. Jesse F. Brady is factory manager. W. W. Downing, Inter-Southern Building, Louisville, is agent.

The Louisville Carbonating Syrup Company, Louisville, has been incorporated with \$25,000 capital stock and will operate a bottling plant. A full line of motor-driven machinery will be purchased. N. A. Hardin, Merchants' Ice & Cold Storage Company, Louisville, is in charge.

The Citizens' Lighting Company, Vine Grove, Ky., is reported in the market for an engine.

New Haven, Ky., has voted to issue bonds for the purpose of taking over the local electric light plant, which will be improved.

Corbin, Ky., has voted to issue bonds for an electric light plant. The town clerk has information.

The Barbourville Water Company, Barbourville, Ky., is reported in the market for deep well pumps.

Sebree, Ky., has voted a bond issue for a waterworks system to cost \$8000.

The East Tennessee Coal Company, Hazard, Ky., is purchasing machinery and other equipment.

The Ashless Coal Company, Hazard, Ky., expects to install equipment to handle 1500 tons daily.

The Wolf Valley Coal Company, Hazard, Ky., plans to increase the capacity of its coal mines by the installation of additional equipment. The total output is to be 1000 tons a day.

The Frankfort Water Company, Frankfort, Ky., is planning improvements, including the installation of a new pump. W. D. Lindsey is in charge.

A municipal abattoir is to be established at Lexington, Ky. Refrigerating and other equipment will be needed. Mayor Cassidy should be addressed.

The Buchanan-Lyon Company, Campbellsville, Ky., will purchase machine tools and other equipment for its garage now under construction.

O. H. Farker and T. A. S. Semple, Sebree, Ky., will install equipment for the manufacture of brick and tile. The capacity of the plant will be 50,000 rods of tiling a season and 10,000 brick a day.

The Sweet Adding & Listing Machine Company, Evansville, Ind., has leased the three-story Foley Building on Upper First street, and will install metal-working equipment for the manufacture of its product. M. S. Whitely is president and W. F. Sweet factory manager.

The Evansville Planing Mill Company, Evansville, Ind., will erect a plant to cost \$60,000. Charles H. Johann is president.

The Kilstark Bed Company, Nashville, Tenn., has been incorporated with \$25,000 capital stock for the manufacture of invalids' beds. A. O. Kleeman, A. P. Whitlock and others are interested.

Lane Bros., Centerville, Tenn., are establishing a heading mill. The equipment was moved from Van Leer, Tenn. It will be enlarged.

Stuart, Va., plans to build a waterworks system, and bids will be received until November 30. Plans and specifications were drawn by J. N. Ambler, consulting engineer, Winston-Salem, N. C.

## Birmingham

BIRMINGHAM, ALA., November 16, 1914.

While generally better conditions prevail the machinery dealers have not shared it except in the tone of inquiry. It prompts them to believe that, with a slight further buoyancy, actual transactions will again assume a respectable volume. No demand exists for wood-working machinery. Machine tools for iron and coal working plants are in fair demand.

The City Delivery Company, Mobile, will build a plant costing \$60,000 to \$75,000.

The Andalusia Light & Power Company, Andalusia, Ala., has been incorporated with a capital stock of \$15,000 by J. D. Henderson and others.

The De Sota Talc Company, Chatsworth, Ga., has been incorporated by O. M. Davis, Jr., Smyrna, Tenn.; Dandridge Spottswood, Petersburg, Va., and others. It will install a pulverizer, saw stands, etc.

The Hickson Lumber Company, Cheraw, S. C., will rebuild its plant.

The Southern Power Company, Durham, N. C., of which G. I. Burkholter is general manager, plans to erect a steam plant for auxiliary use.

Lancaster, S. C., will receive bids until December 1 for a sewage disposal plant.

## St. Louis

ST. LOUIS, MO., November 16, 1914.

Conditions in the machine-tool market continue about the same as for the past 60 days, except that additional tentative inquiry is appearing. This indicates activity after the first of the year. An increase in incorporations in this territory is noticeable, but machinery purchases for new enterprises will probably go over until 1915. A little inquiry is noted for some few second-hand tools. Collections are fair. Banking conditions are steadily improving and the opening of the regional reserve banks is being watched with some interest as to the possible effect on new financing.

The Jiffy Water Heater Company, St. Louis, has increased its capital stock from \$15,000 to \$25,000 for the purpose of increasing its plant capacity.

The plant of the Warren Casting Company, St. Louis, was damaged about \$10,000 in a fire November 13, the loss being chiefly on mechanical equipment and patterns. President C. E. Hayden, International Life Building, states that the equipment destroyed will be replaced at once.

The Tate-Gillham Motor Car Company, St. Louis, has been incorporated with a capital stock of \$10,000 by F. R. Tate, F. C. Gilham and H. W. Blodgett, and will equip a repair plant.

The St. Mary Machine Company, St. Charles, Mo., has let contracts covering the erection of a machine shop 100 x 150 ft., and a foundry, 70 x 160 ft.

The Modern Auto Repair and Reconstruction Company, St. Louis, has acquired larger quarters and will increase its shop facilities.

The Mississippi Electric Navigation Company, St. Louis, has been incorporated with a capital stock of \$2,000,000 by J. B. Trescott, L. H. DuPaul and R. H. Tait, and will build and operate electrically-driven river transports.

Moreno, Brooks & Burkham, St. Louis, have been awarded a contract for the construction of a sewer system at Argenta, Ark., to cost about \$250,000 and are reported in the market for additional equipment.

The Economy Heating & Plumbing Company, Kansas City, Mo., has been incorporated with a capital stock of \$12,000 by A. B. Shannon, N. L. Harrison and E. W. Freschlag, and will equip a machine shop.

The Berry Iron & Steel Company, St. Joseph, Mo., has been incorporated with a capital stock of \$12,000 by G. D. Berry, O. Halstead and A. R. Berry, and will engage in steel fabrication.

George E. Joslin, Cassville, Mo., will install a 10-ton ice-making and refrigerating plant.

The Chillicothe Ice & Fuel Company, Chillicothe, Mo., of which W. J. Riley is the proprietor, will increase the capacity of its ice plant from 25 to 35 tons per day.

A cold storage plant and refrigeration system will be installed at Macon, Mo., by the Federal Fruit & Cold Storage Company, New Orleans, La.

The Quality Ice & Cold Storage Company, Kansas City, Mo., will add ice-making equipment. Robert M. McCandlish, engineer, is in charge.

The Western Auto Supply Company, Kansas City, Mo., has been incorporated with a capital stock of \$20,000 by George Popperdine, E. R. Baker, and others. It will equip to manufacture automobile accessories, etc.

The Saddlery plant of the Herman Sadford Company, Springfield, Mo., has been burned with a loss of \$265,000, about \$100,000 being on equipment. It will be rebuilt.

The Southern Railway will erect at Denverside, East St. Louis, Ill., an 18-stall round house with a 90-ft. turntable, coal and cinder-handling equipment, a machine shop, etc., at a total cost of \$275,000. C. R. Craig, 1300 Pennsylvania avenue, Washington, D. C., is purchasing agent.

The Blytheville Compress & Warehouse Company, Blytheville, Ark., has been incorporated with a capital stock of \$100,000, an increase from former capital of \$60,000, to provide for an increase in equipment.

An ice-making plant of 5 tons daily capacity will be installed at Lonoke, Ark., by Victor Daugherty.

The Griswold Mfg. Company, Cotter, Ark., will install additional wood-working machinery, doubling its present capacity.

M. C. Trumbull has acquired a stave mill at Shady, Ark., and will install a 25-hp. engine, etc.

The cotton gin of I. J. & L. T. Bass, Beardon, Ark., which has been burned with a loss of \$10,000, will be replaced.

The Chaney-Hughes Gas & Oil Company, Claremore, Okla., has been incorporated with a capital stock of \$60,000 by J. Q. Adams and others, and is receiving bids for the installation of a pipe line and pumping apparatus.

The Foster Creek Lumber Company, Gloster, Miss., will increase its capital stock from \$450,000 to \$600,000. Its plans, which involve rebuilding, etc., have not been completed.

Gulfport, Miss., has rejected the bids received for its proposed waterworks plant extension and will receive new bids.

Alexandria, La., will receive bids until December 7 for two 2-stage fire pumps, a single-stage service pump, a surface condenser, a vertical submerged type pump for condenser, a vertical sewage pump, etc.

The board of port commissioners, New Orleans, La., of which Ernest M. Loeb is president, will receive bids until December 14 for the construction of a cotton compress, warehouse and handling equipment, power house, garage, etc. Bacon & Davis are the engineers.

The Marksville Light & Ice Company, Marksville, La., has been incorporated with a capital stock of \$10,000 by

E. M. Kursheedt, J. R. Black and R. P. Strong, and will establish a public service electric plant and an ice factory.

C. A. Rees, Shreveport, La., will install an electric light plant at Melville, La., at a cost of about \$15,000.

The Standard Mfg. Company, New Orleans, La., has been incorporated with a capital stock of \$40,000 by J. S. Winehill and F. J. Gregory.

The Portable Wall Closet Company, Shreveport, La., has been incorporated with a capital stock of \$15,000 by J. G. Levey, F. E. Russ, J. Weisman and G. M. Leadman. Wood-working machinery will be required.

The North Louisiana Shingle Company, Monroe, La., is reported in the market for about \$7500 of machinery with a capacity of 125,000 shingles per day.

The Rhoda Lumber & Veneer Company, Morgan City, La., has been incorporated with a capital stock of \$10,000 by E. F. White, B. A. Storm, and others. It will continue an established business, adding some new wood-working machines.

The Republic Box Company, New Orleans, La., has been incorporated with a capital stock of \$10,000 by F. L. Samuels, R. O. Harris, and others, to manufacture wire-bound wooden boxes.

The Schwing Lumber & Shingle Company, Plaquemine, La., is erecting a box factory.

## Texas

AUSTIN, TEXAS, November 14, 1914.

The machinery and tool trade situation is unchanged. A slight increase in the demand for machinery for industrial plants is noted. The poor bond market is causing many towns to defer making improvements to their public utility plants.

The Perry Kirkpatrick Company, El Paso, will build a machine shop.

The Auto-Mat Tabular Company, Ft. Worth, plans to erect a plant for the manufacture of printing devices. C. W. Stanton is one of the principals.

The Southwestern Chemical Company, Dallas, will construct a plant for the manufacture of chemicals.

The Citizens' Ice Company, Paris, has been organized to construct an ice factory. C. T. Ford is one of the owners.

The wagon manufacturing plant of the Bender Wagon Company, Texarkana, recently destroyed by fire, will be rebuilt. Some machinery will be required.

The plants of the Orange Ice, Light & Water Company, Orange, recently purchased by W. H. Stark, will be enlarged.

R. W. Mitchell, Tularosa, N. M., will install a pumping plant in connection with a proposed system of irrigation.

Improvements will be made to the municipal water and light plants of Seguin at a cost of about \$20,000. Bonds for the purpose have been issued.

It is reported that the Texas Southern Electric Company, Corpus Christi, plans to construct a network of interurban railways in the southern part of the State and to build power stations.

The Southwestern Cooperage Company, Ft. Worth, will build a cooperage plant to have a daily output of 600 bbl. A complete equipment of machinery will be installed.

The Texas Anchor Fence, Iron & Wire Works, Ft. Worth, is constructing a plant to be equipped with the latest machinery.

The Vaughan Gin Company, Quanah, which has a capital stock of \$50,000, will build a cotton gin. J. L. Russell is a leading factor in the enterprise.

The Valverde Irrigation Company, Del Rio, will install an irrigation pumping plant. More than 4000 acres of land will be watered.

Everett Love, Laredo, will install a pumping plant to supply water for irrigating 310 acres.

The Walker Properties Association, Austin, will install additional machinery and double the capacity of the meat-packing plants and canning factory.

## The Pacific Coast

SEATTLE, WASH., November 10, 1914.

The machinery trade, although still quiet, shows encouraging features. The lumber industry is operating at only about 40 per cent. capacity, but many scattering orders for equipment are received. Interest is shown in improved methods of handling logs and lumber, in view of the expectation of a very heavy Eastern and export demand on the close of the war. The grain and canned goods industries offer more encouragement for the immediate future. Salmon packers are beginning to figure on new equipment. The development of new grain acreage results in a steady de-



mand for implements. Some activity is felt, especially in harbor improvements; and the outlook is favorable for dock installations of cargo-handling equipment.

It is announced that the Seattle Ship & Engine Building Company, Seattle, Wash., recently organized, will shortly begin work on a shipbuilding plant at the head of Seattle harbor.

The Portland Oxygen & Hydrogen Company, Portland, is building a plant at East Seventeenth and Center streets, to supply oxygen and hydrogen for welding and other industrial purposes.

The Eagle Harbor Transportation Company, Seattle, is taking figures for a 130-ft. steamer, to be equipped with an 800-hp. triple expansion engine.

It is reported that D. H. Sears, Port Alberni, B. C., will erect a large shingle mill in Seattle, Wash.

The Mower Portable Automobile Garage Company, Seattle, is planning to erect a factory for the manufacture of portable garages.

The Eureka Lumber Company, Eureka, Mont., whose lumber plant was recently destroyed by fire, has practically completed plans for rebuilding at an estimated cost of \$150,000. It will be equipped with two bandsaws and a gang saw, having a total capacity of 300,000 ft. in 20 hours. A power house, with a 900-hp. engine, and a battery of five boilers of 150 hp. each, are included in the construction. An electric plant will furnish power for the machinery and supply lights for the mill and town. Dion & Horstkette, architects, Minneapolis, have complete charge of the work. C. A. Weil is president of the company.

The Pocatello Engineering & Machinery Company, Pocatello, Idaho, has been incorporated. It will act as agent for machinery and supply manufacturers on a commission basis throughout the neighboring territories. A. R. Reddish is president and R. P. Fairbank, manager.

The Anderson Steamboat Company, Seattle, Wash., has been awarded contract for construction of the lighthouse tender Rose. The company will install a double-triple-expansion engine and two boilers. J. L. Anderson is president.

J. B. Valentine and L. D. Crow, Spokane, have plans for the establishment of factories at Walla Walla and Spokane, Wash., for the manufacture of sacks from wheat straw. The factories will cost about \$18,000 each.

The Nordman-Jacobson Lumber Company, Ophium, Mont., has been incorporated with a capital stock of \$40,000, by William Nordman, A. H. Anderson and E. H. Jacobson. It plans to erect a sawmill.

The Moon Williams Lumber Company, Grants Pass, Ore., are making arrangements for a site for a sawmill. Plans are already prepared.

Plans are under way by the Northern Pacific Railway Company for the installation of electric motors and equipment for its new coal bunkers at Ellensburg, Wash.

Plans for an electric power and light plant in Hubbard, Ore., are being drawn by the Portland Railway, Light & Power Company, Portland.

The City Commission, Portland, has directed municipal purchasing agent Wood to advertise for bids for the installation of an electric lighting system in the municipal buildings under construction at the Bull Run Head Works. Bids were to be received about November 10, with the opening date not set.

The City Council, Shoshone, Idaho, are having plans prepared for a nitrogen lighting system to replace the arc lights now in use.

An electric light and power plant will be erected in Dooley, Mont., by O. B. Haven and Frank Courtney, Antelope, Mont., who are in the market for electrical machinery.

The Blewett Mfg. Company, Spokane, implement manufacturer, has been incorporated to manufacture a harvester. Arrangements have been made for the lease of the plant of the Yellow Pine Lumber Company and machinery will be installed at once.

The Western Union Mines Company, recently incorporated by J. L. Harper, Spokane, and others, will add a 3-unit Diesel crude oil power plant of 1000 hp., etc.

The Stanley Smith Lumber Company, Hood River, Ore., whose plant was recently destroyed by fire with a loss of \$65,000, will rebuild.

The Oregon-Washington Railroad & Navigation Company, Spokane, is about to start the construction of a machine shop 86 x 126 ft., two roundhouses, turntable, power house, coaling dock, etc., at a cost of about \$150,000. A. F. Marion is the engineer in charge of construction.

Azusa, Cal., has voted \$35,000 of bonds for a waterworks and \$20,000 of bonds for a lighting system. C. W. Bouldin is city clerk.

## Eastern Canada

TORONTO, ONT., November 14, 1914.

Fire completely destroyed the factory of the Classic City Furniture Company, Stratford, Ont., with a loss of \$30,000.

The Trenton Cooperage Mills, Spragg street, Trenton, Ont., will rebuild its plant which was recently destroyed by fire. The construction work will be started next spring and the plant will cost \$12,000.

The Toronto Board of Control has decided to build new car barns and purchase a quantity of new rolling stock for the Civic Street Railway.

Frank Reardon, 25 Seymour street, Halifax, N. S., will rebuild his plant which was destroyed by fire recently with a loss of \$40,000.

W. T. Atkinson, Amherstburg, Ont., is contemplating the erection of a factory at Windsor, Ont., for the manufacture of tile and concrete products, etc.

The St. Mary's Wood Specialty Company, Ltd., St. Mary's, Ont., is reported to be in the market for the following machinery: A Fisher or similar re-saw, an Ober axe handle lathe and an Ober rod machine.

On December 1 the various branches of the Massey-Harris Company in Ontario will reopen and run throughout the winter. The company closed down most of its branches at the time war was declared in Europe.

An order has been granted by Justice Middleton winding up Chapman & Walker, Richmond street, West, Toronto. The company dealt in electrical and gas fixtures and machinery.

Fire completely destroyed the sawmill of Arthur Moore at Falkenburg, Ont.

The Crystal Glass Company is having plans drawn for a factory to be erected at Beattie and Ross streets, Ft. Erie, Ont. William E. Hunt, Ft. Erie, is one of the organizers.

Reginald Bartlett, Toronto, president Bartlett Automobile Company, has signed an agreement with Stratford, Ont., to establish an automobile factory there. The company is capitalized at \$1,000,000. It will manufacture a medium-priced automobile.

The Canadian Tar Products Company, Ltd., Montreal, has been incorporated with a capital stock of \$500,000 by E. M. McDougall, Gilbert S. Stairs, P. F. Cosgrain, and others.

The Chaleur Pulp & Lumber Company, Ltd., Montreal, has been incorporated with a capital stock of \$75,000 by H. S. Ross and E. R. Angers, barristers; J. G. Robertson, and others.

The Nairns' Falls Power & Pulp Company, Ltd., Malbaie, Que., has been incorporated with a capital stock of \$100,000 by L. A. Martin, Real Pepin, L. G. Morin, Montreal, and others, to manufacture pulp and paper and to construct and operate power plants, etc.

The Superior Tubes & Accessories, Ltd., Toronto, has been incorporated with a capital stock of \$300,000 by W. A. J. Case, 1201-1205 C. P. R. Building, Toronto; J. B. Taylor, C. G. Lynch, and others, to manufacture automobile equipment, etc.

## Western Canada

WINNIPEG, MAN., November 14, 1914.

Managers of local machinery houses are inclined to be more optimistic than they were last month. No noticeable increase in the volume of business has set in, but dealers are expecting a better demand for supplies for next spring. Business men generally frankly admit that they do not expect any great industrial expansion until money begins to come from the old country again for investment here.

The Orford Bay Timber & Logging Company, Ltd., Vancouver, B. C., has been incorporated with capital stock of \$175,000.

The Town Council, Canora, Sask., is spending \$54,000 on the installation of a waterworks system. Chipman & Power, Mail Building, Toronto, are the engineers.

The Saskatchewan Concrete Post Company, Ltd., Regina, Sask., has been incorporated with capital stock of \$25,000. A factory will be erected. F. H. Reed, 2347 McIntyre street, Regina, is president.

The Associated Cement Company, Ltd., Victoria, B. C., has been incorporated with a capital stock of \$2,000,000 by J. S. Lovell, 25 King street, West, Toronto, William Bain, Robert Gowans, and others, of Toronto, Ont., to manufacture cement, etc.

The British Columbia Provincial Government has agreed to loan \$52,000 to Ft. George, B. C., for the construction of a waterworks plant.

The Edmonton, Dunvegan & British Columbia Railway Company, Edmonton, Alberta, will construct a power house to cost \$8000 and an engine room to cost \$10,000 at St. Alberts Trail.

The Alberta Linseed Oil Mill Company, Ltd., Medicine Hat, Alberta, will install the following machinery in its recently renovated factory: Breaker, rolls, belting, pipe, tools, hydraulic pump, filter press and also repairs to presses. None of the above machinery has been ordered. W. W. McCeely is manager.

## Government Purchases

WASHINGTON, D. C., November 13, 1914.

The Bureau of Supplies and Accounts, Navy Department, Washington, D. C., will open bids December 15 for the following tools for delivery to Brooklyn: miscellaneous milling and combination end and side milling cutters, schedule 7605; 2 single-spindle motor-driven sensitive drills, schedule 7606; 1 motor-driven flat turret lathe, schedule 7606; 1 jewelers' lathe, mounted on pedestal, schedule 7606; 1 variable speed motor-driven lathe and extra attachments, schedule 7605; 2 screw-cutting engine lathes, 10-in. swing, 3-ft. bed with motor drive, schedule 7606; 1 motor-driven universal turret lathe with geared friction head, 18-in. swing, 6-ft. bed, schedule 7606; 1 motor-driven armature and field coil winding machine, schedule 7606.

For Newport, R. I., 1 motor-driven spur and helical gear shaper, schedule 7604.

F.o.b. works, 1 electrically-driven hoist, schedule 7603.

## THE MAKING OF SHRAPNEL

### General Requirements as to Material, Construction and Manufacture

BY AN OCCASIONAL CONTRIBUTOR

It requires but little investigation to demonstrate that the making of shrapnel in which so much interest is now being taken because of the orders placed here by foreign governments, as well as the further orders which are understood to be pending, is by no means a simple proposition. Rigid standards have to be met; opinions vary as to the stock which best can be used in making the shells; there are natural differences as to the machines and methods which should be employed, and the specifications of all the governments have certain individual peculiarities of design which from a mechanical point of view are important, minor as they may appear to the layman.

The tests to which shrapnel are subjected make it essential that in their manufacture there must be no deviation from careful workmanship and selection of material and there must be no "good enough" except that which is in strict accord with specifications. The remark has been made that foreign governments would in their time of stress "take anything," but experts who have looked into the subject declare this to be an attitude which will lead to rejections when tests are made. Included in the tests commonly used is one for fragmentation, conducted in a bomb-proof in which the entire shell is destroyed; another is to prove the correct breaking or bursting of the shell at the outer or fuse end, if the design of the shell provides for that to permit the free ejection of the shot, and another is a test for accuracy of flight. A deviation from true flight which might result from an unbalanced shell would easily work destruction among troops over whose heads and for whose protection the shrapnel was fired. In the inspection of the completed shells some authorities use 25 to 35 gauges to prove the dimensions of but one size.

In the United States, shrapnel is made directly from bar stock or blanks which are forged or pressed by powerful machines, the blanks being hollow. In Europe steel castings are used also and a sample from each heat is subjected to a laboratory test. The common impression here is that castings could not be used, although they are used, of course, in armor-piercing projectiles. The steel used is exceedingly hard and tough, approximating tool steel. With forgings there usually is plenty of stock to be removed because of the nature of the forging, the inside oftentimes not being true with the outside. Roughing cuts are likely to be uneven, as much as  $\frac{1}{8}$  in. being taken off at places. A

speed of 20 ft. per minute is about usual in roughing cuts and 40 to 50 ft. per minute in finishing the shells, making the average cutting speed about 30 ft. per minute. A reason why the material must be of the requisite quality is the tendency of the shell to upset or bulge when fired from the gun, although the design of the shell enters also into this requirement for stability.

The toughness of the metal alluded to makes it advisable to make shrapnel on machine tools possessing great strength and rigidity, as even where a shell of small diameter is being made, light tooling and light machines are at a disadvantage. In using the turret lathe an advantage is found in the fact that not so many skilled mechanics are needed, as the operations can be performed with the ordinary class of labor and a number of operations can be performed on each machine. Where other than turret lathes are used, there is the advantage of less expensive and simpler machines, although a less amount of work is done on each machine. The development of the heavier types of turret lathes provides a means for doing automatically the greater part of the work. Ordinarily the production of a 3-in. shrapnel case, covering all lathe-work, including roughing and finishing from the forging to the finished case, requires 25 to 35 min. At some point in their manufacture the cases are heat-treated, the method varying with the specifications of the different countries. It sometimes is done before any machining, and in other cases between operations, and again, after the machining is completed.

There is great variation in details in the shrapnel of the various governments, some being completely bored out on the inside, while with others very little work is done on the interior beyond enough to insure balance and machining the shoulder on which rests the diaphragm or part which separates the powder and shot chambers. The outer walls of some of the designs are practically parallel, others taper toward the outer end and others have a slight enlargement at that end. With some methods the outer end of the case is swaged in after the diaphragm has been dropped in place, with others this is not done. Some designs call for a sort of flare on the inside of the case, the largest diameter being near the opening. In all cases, around the base of the shell is placed a copper band which fits tightly into the bore of the gun and in the circumference of the base there also are grease grooves. The specifications usually call for the packing of the cases in boxes of approved size and design so that they can easily be transported to the field or elsewhere.

The timing device, attached to the outer end of the shell, is a rather complicated and most important factor. The adjustment of an index regulates the burning of the fuse from the instant the shrapnel is fired. The shot-filled shells are sometimes shipped without the timing device, the latter being placed on the shell later, as it can be done on the field, if necessary. The shot within the shell is surrounded with a resinous material to keep them in place. The loading with powder is done by only a few companies in this country, the explosive entering the powder chamber through a tube which fits in the center of the diaphragm and runs through the center of the cylinder.

A firm which is considering a shrapnel contract has agreed, according to report, to sublet the making of the fuse and time mechanism to a well-known firm of watch manufacturers.

The Eastern Car Company and the Nova Scotia Car Works are now at work on the first equipment contracts that have been placed in Canada in several weeks. They are orders from Canadian Government railroads. The Eastern Car Company order is for 250 50-ton all-steel freight cars, and the Nova Scotia Car Works order is for 200 all-steel flat cars. The Preston Car Company has received some orders for sleeping cars.

The Queen City Brick Machine Company and the Helm Brick Machine Company have been combined under the name of the Helm Brick Machine Company and its address is Cadillac, Mich., instead of Traverse City, Mich., as heretofore.

## Trade Publications

**Universal Turret Screw Machine.**—Warner & Swasey Company, Cleveland, Ohio. Pamphlet. Treats of the company's No. 4 universal turret screw machine which was illustrated in *The Iron Age*, July 30, 1914. After a brief introduction, which touches upon the special features of the machine, the construction is gone into at some length, the text being supplemented by a number of halftone engravings. The specifications, which are exceptionally complete, are next presented, followed by an illustrated list of the standard tools that are furnished. Several pages of illustrations of chucking and bar work that has been turned out by the machine are included.

**Lubricator.**—Erikson Lubricator Company, Inc., 87 Weybosset street, Providence, R. I. Folder. Relates to a mechanical device for automatically applying grease or oil to pistons of engines, locomotives and air brakes, elevators and elevator guides. The way in which this lubricator operates is touched upon at some length, and the text is supplemented by an engraving of the device.

**Ornamental Iron and Bronze Work.**—J. E. Bolles Iron & Wire Works, Inc., Detroit, Mich. Mailing card. Shows a few samples of ornamental bronze and iron work that have been turned out by this company. These include gates, office grille work, fire escapes, elevator cages, stairs, etc.

**Ball Bearing Polishing and Buffing Machinery.**—Webster & Perks Tool Company, Springfield, Ohio. Pamphlet. Concerned with a line of polishing and buffing lathes, in which ball bearings are used. These machines are made for belt or direct-connected motor drive in the floor type. Illustrations of the different machines are presented, together with condensed tables of specifications and brief descriptions. Mention is made of a floor and a bench grinding machine and the wheel guards that can be furnished. The spindle construction which employs self-aligning ball bearings is gone into at some length.

**Stay Bolts.**—American Flexible Bolt Company, Union Bank Building, Pittsburgh, Pa. Pamphlet. Describes a line of bolts which can be furnished to railroads and others, in the construction of which a new principle for securing greater flexibility is embodied. After a brief discussion of why stay bolts break and fire boxes crack, illustrations and brief descriptions of the bolts that can be supplied are presented.

**Tanks.**—Hamburg Boiler Works, Hamburg, Pa. Booklet. Lists an extensive line of tanks that are made in various sizes with different thicknesses of plate. In connection with the tables of the sizes, the capacity, weight and price are also given. Tapping diagrams and views of the different kinds of tanks are presented, and rules for ascertaining the safe working pressure of a cylindrical tank or steel plate drum are included.

**Vises.**—Athol Machine Company, Athol, Mass. Pamphlet. Concerned with a line of vises that are equipped with a patented type of handle that is designed to stay in one position as long as may be desired. The vises, which are made with both the swivel and the solid bases, are illustrated and briefly described with tables of the sizes in which they can be supplied. Mention is also made of combination pipe vises and taper attachments for holding tapered pieces in either a vertical or horizontal position.

**Glass Floors and Partitions.**—Frederic L. Kettler, 101 Park avenue, New York City. Pamphlet. Treats of a form of glass construction for floors, roofs, vaults, pavements, walls and partitions. The object of this construction is to provide more light and eliminate as far as possible the use of artificial lighting in the daytime. It consists of translucent glass units supported by reinforced concrete with one surface composed entirely of glass. Diagrams showing the arrangement of the various parts are presented, as well as views illustrating the distribution of light in places where this construction has been installed. A diagram showing how practically all the light rays striking the glass are reflected is included.

**Chain Grate Stokers.**—Illinois Stoker Company, Alton, Ill. Catalogue. Illustrates and describes a chain grate stoker which is designed for handling coal of all sizes and grades. The descriptive matter is supplemented by engravings of the stoker and its several parts, as well as views of installations. Reports of a number of tests of various fuels are included. An illustrated description of the stoker appeared in *The Iron Age*, July 16, 1914.

**Firebrick.**—Stowe-Fuller Company, Rockefeller Building, Cleveland, Ohio. Catalogue. Contains information of value to various consumers of refractories, and is intended to serve as an aid in the selection of the proper materials for specific requirements. The process of making the brick is gone into at some length, the text being supple-

mented by a number of halftone engravings. Illustrations of the various brands of brick are presented, with data on their uses, and this is followed by a list with illustrations of the different shapes that are carried in stock. These bricks are made from the ordinary materials, as well as magnesite and chrome ores. Tables showing the number of bricks required for various circles are presented, as well as useful information on other points.

**Water Softening.**—Permutit Company, 30 East Forty-second street, New York City. Pamphlet. Calls attention to a process of softening water in which an artificial zeolite is used for the filtering material instead of sand. The use of this material for removing the scale forming elements from boiler feed water and the water used in various industrial processes is described at some length, with illustrations of the different types of filters used. One of the special features of the process is that the salts producing the hardness of the water are entirely removed automatically, and when the sodium constituting the removing element of the filtering material is exhausted, the original strength can be restored by passing it through a solution of common salt. A number of sketches of layouts for the softening of water and the removal of iron and manganese are included.

**Iron Cement.**—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Pamphlet. Calls attention to two grades of iron cement, designed for use in the foundry for filling blowholes in castings. The uses of the two grades of cement, which being made of iron expand and contract in the same ratio as the body of the casting and hence cannot work out, are briefly touched upon.

**Pneumatic Tools.**—Monarch Pneumatic Tool Company, Railway Exchange Building, St. Louis, Mo. Bulletin No. 18-A. Covers a line of pneumatic tools that includes drilling and wood boring machines, riveting and chipping hammers, rivet busters and holders on. The two inside pages are given over to illustrations of the various tools, with brief statements of the work they are designed to do, while capacity tables and data on the weight of the tools are presented on the last page.

**Iron Bars.**—Lockhart Iron & Steel Company, Vulcan Iron Works, Pittsburgh, Pa. Folder. Lists the various sizes of flats, rounds and half rounds, squares, hexagons, ovals and half ovals, bevells, channels, angles and round edge wagon tire iron, that are regularly carried in stock, with data on their weights.

**Screw Machines.**—Brown & Sharpe Mfg. Company, Providence, R. I. Catalogue No. 20-G. Relates to a line of plain, wire feed and automatic screw machines, together with the attachments and tools that can be supplied for use with them. After a general description of the machines, the wire feed screw machine, with automatic feed, is taken up and described, the text being supplemented by a number of engravings. Plain and automatic screw machines are described in the same way, and at the end of each section there are illustrations and condensed specification tables of the different machines of each class. The attachments and tools that can be supplied for use with the machines are illustrated and described, and in some cases dimension diagrams and tables are presented. A comprehensive telegraph code and complete index are included.

**Stamping Press Guard.**—Southern Stamping & Mfg. Company, Nashville, Tenn. Folder. Points out the advantages of using a guard on stamping presses to prevent the operator from being injured. The special features claimed for the guard are ease of operation, removal and replacement; protection against accidents and the absence of any reduction in the speed of operation. Illustrations of the guard raised to permit placing of the work in the press and also down to prevent accidents are employed to supplement the text description of the guard and its manner of operation.

**Concrete Hardener.**—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Folder. Illustrations and descriptive matter explain the use made of the company's No. 7 iron cement as a hardener for concrete driveways, sidewalks and floors, as well as making them dust, oil and waterproof. One of the places where this cement was used was the driveway leading to the ash chute room in the power house of the Grand Central Station, New York City, where in addition to the passage of heavy trucks, ashes and cinders fall to the floor and are ground to a powder.

**Metal Working Machinery.**—Springfield Machine Tool Company, Springfield, Ohio. Catalogue H. Illustrates and describes a line of machine tools that includes lathes of various sizes and types, shaping machines and presses. A general description of the lathes, which are built with two different systems of gearing connected with the lead screw and feed rod, is presented, followed by comprehensive illustrated descriptions of the various parts. This occupies 18 of the 64 pages of the catalogue, the remainder being given over to descriptions of the different tools. For the most part



these are presented on facing pages, an engraving occupying one page, with a brief description and table of specifications on the other.

**Locomotive Cranes.**—Link-Belt Company, Chicago, Ill. Book No. 158. Devoted to illustrations of the application of the company's locomotive cranes, which combine in one machine a portable hoisting engine, steam derrick, grab bucket unloader and switch engine. In connection with the illustrations, brief descriptions of the size of crane and the material handled are given. Clearance diagrams of the four and eight wheel cranes are included, together with a brief mention of the circular system of coal storage.

**Swing Hammer Pulverizer.**—Jeffrey Mfg. Company, Columbus, Ohio. Bulletin No. 132. Devoted to a swing hammer pulverizing machine for reducing limestone, shale, etc. Illustrations of the machine, a small size of which was illustrated in *The Iron Age*, June 5, 1913, and its various parts are presented, together with a diagram showing the dimensions. A table of the output in various materials is given together with a list of users.

**Power Hammers, Emery Grinding Machines and Countershafts.**—Kerrihard Company, Red Oak, Iowa. Catalogue. Illustrates and describes a line of power hammers, and bench grinding machines and countershafts. The descriptions are brief but comprehensive and condensed specification tables are included. Mention is made of a direct-connected low-voltage generating set for shop and home use where central station power is not available.

**Air Compressors and Mine Hoist Equipment.**—General Electric Company, Schenectady, N. Y. Two bulletins. The first, No. 42,800, is devoted to the use of electrically driven air compressors in foundries. It compares centrifugal compressors with the ordinary fan and positive pressure blowers, and shows the superiority of the centrifugal compressor for this class of service. The other, No. 48,014, takes up the question of the economy of the electric drive and treats of the general subject of underground hoists, their operation and control. The illustrations include a number of views of installations of apparatus as well as engravings of the hoists themselves.

**Drills.**—Morse Twist Drill & Machine Company, New Bedford, Mass. Describes chiefly by illustrations and tables of sizes a line of tools which includes drills, reamers, chucks, milling cutters, taps and dies. In addition to the 225 pages of the catalogue proper, there is a 24-page appendix, giving general information on such subjects as the dimensions of tapers, the grinding of twist drills, decimal equivalents and data on screw threads, etc.

**Springs and Screw Machine Products.**—Wallace Barnes Company, Bristol, Conn. Booklet No. 6. Illustrates and describes a line of springs of various types and materials, with specifications and tables of capacities. A list of the various sizes of springs that can be furnished is included. Illustrations of a great variety of screw machine products are also presented.

**Autogenous Welding and Cutting.**—Waterhouse Company, Pelham street, Boston, Mass. Two pamphlets. In the first illustrations and descriptive matter explain the construction and use of oxy-acetylene plants for welding and cutting. In connection with the illustrations and descriptions of the different types that can be supplied, lists are given of the apparatus that is included. The other pamphlet is devoted entirely to work that has been done by the company. Views of the parts both before and after the repairs have been made are presented, together with brief descriptions of the work that was done.

**Pipe Welding.**—Goldschmidt Thermit Company, 90 West street, New York City. Second edition of pamphlet No. 16. Calls attention to the advantages of employing the Thermit process for butt welding pipes in refrigerating plants and for high-pressure steam, hydraulic and compressed air pipe lines. The process is described in detail, telling how the welds are made and giving information on the cost of making the welds, crucibles and other apparatus needed. Illustrations of pipes welded in this way are presented, together with reports of bursting and tensile tests that were made on them.

**Portable Electric Tools.**—Temco Electric Motor Company, Leipsic, Ohio, Zinke Company, Inc., 1322 Michigan avenue, Chicago, Ill., general sales agent. Describes the general construction and design of a line of portable electric tools, followed by illustrated descriptions of the various units, which include drills, tool post grinding machines and a buffing and polishing machine. Instructions to the operator on the use and care of the tools are included.

**Die Cutting and Profiling Machines.**—Keller Mechanical Engraving Company, 70 Washington street, Brooklyn, N. Y. Books Nos. 1 and 3. The first mentions a line of machines for the cutting of dies, molds, rolls, hubs, etc., and in addition to illustrations and descriptions of the ma-

chines, contains reproductions of impressions from dies cut on them, as well as a list of users of the machines. The other book deals with an automatic profiling machine which is an engraving or milling machine operating on the profiling principle that is capable of reproducing in steel, iron, brass, etc., the detail of a pattern in relief or intaglio. As was the case in the other book, the illustrated description is supplemented by reproductions of impressions made from dies cut on the machine.

**Concrete Floors.**—Waxement Company, Inc., 51 Chambers street, New York City. Folder. Describes the use of the Waxement process for making dustless floors by holding the silica and cement particles in the concrete mass more firmly together and thus preventing abrasion. The special advantages of this process, which are dustlessness, durability, economy, convenience, non-absorptiveness and sanitariness are touched upon.

**Carburetor.**—John R. Price, Inc., 68 Marshall street, Newark, N. J. Pamphlet. Describes a carburetor for internal combustion engines, the special features of which are the use of a concentric float chamber to keep the gasoline at a constant level at the jet, the securing of a multiple jet effect, the employment of an auxiliary device to adjust mixtures for low throttle positions and ease of installation and adjustment. These features are touched upon at some length, followed by directions for adjusting, with drawings showing the various parts.

**Steam Generation.**—United States Non-Condensing Boiler Company, 517 Marine Bank Building, Erie, Pa. Pamphlet. Calls attention to the Moffat system of steam generation, in which the heating of the feed water is entirely independent of the generation of steam. The pamphlet contains a description of the system, together with illustrations showing its application to boilers. Results of tests made on boilers employing this system are included.

**Sensitive Drilling Machines.**—Sigourney Tool Company, Hartford, Conn. Circular. Concerned with vertical drilling machines, which are made in the floor type with one, two, three and four spindles, and also in the single-spindle bench type. After a brief description of the machines, illustrations are presented of the various styles. Mention is also made of a special countershaft that can be furnished, although the machines are generally driven directly from the main lineshaft, and a motor drive that can be supplied with either a silent chain or a belt connection for transmitting the power. A condensed table of specifications and a list of the various appliances that can be supplied are included.

**Grinding Machines.**—Star Specialty Mfg. Company, 227 West Erie street, Chicago, Ill. Pamphlet. Covers a line of small grinding machines, designed for clamping to or mounting on a bench. All of these are illustrated and briefly described, and a price list of repair parts is included.

**Chain Hoist.**—Wright Mfg. Company, Lisbon, Ohio. Hoist catalogue No. 6. Concerned with a line of chain hoists which are made in the triplex or spur geared, screw and differential types. The various patterns of hoist are illustrated and tables of the several sizes and the prices of the different repair parts are included. Brief mention is also made of a line of plain and geared trolleys and hand traveling cranes.

**Canvas Belting.**—Sawyer Belting Company, Cleveland, Ohio. Booklet. Describes a line of canvas belting which is made in a number of different styles. Views of the various brands of belting are given together with information on the process of manufacturing. Brief mention is made of a dressing and a belt paint that can be furnished.

**Ball Bearings.**—S. K. F. Ball Bearing Company, 50 Church street, New York City. Bulletin No. 21. Treats of the application of ball bearings to machinery used in the paper making industry. After a brief account of the construction of the bearings, their use on various machines, such as barkers, Jordan engines, calendars, press rolls, etc., is gone into at some length, the text being supplemented by halftone engravings of the machines themselves and engravings and drawings of the bearings. Mention is made of the use of the bearings on transmission lines and auxiliary equipment, and instructions for mounting the bearings are included.

**Ventilating Fans.**—Barney Ventilating Fan Works, 62 High street, Boston, Mass. Pamphlet. Treats of a compound ventilating fan for expelling impure air from factories, mills, and buildings, and removing dust, smoke, steam, odors, etc., a large volume of air being handled at a low pressure. After a brief description of the construction of the fan, tables of dimensions and the volume of air handled by different sizes at various speeds are given. Directions for setting the fan are included, together with a number of tables of useful information.



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